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Original Articles

The Treatment of Acute Appendicitis

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First, that patients suffering from acute appendicitis without regard to the severity of the infection or its character practically all recover, providing the appendix is removed with proper precautions by a skilled surgeon while the infectious material is still confined to the appendix.

Second, that in almost all cases this condition obtains for at least thirty-six hours after the beginning of the attack.

Third, that in severe acute cases the infection usually extends beyond the tissues of the appendix after forty-eight hours, and practically always if the patient comes under treatment later than seventy-two hours after the beginning of the attack.

Fourth, that the dissemination of the infection originating in a perforated or gangrenous appendix is greatly facilitated by the administration by mouth of food and cathartics.

Fifth, that almost all fatal cases following operation for the relief of acute appendicitis occur in patients who have been ill longer than two days and less than ten days before being operated.

Sixth, that all fatal cases which died without having been operated had received either food or cathartics or both by mouth after the beginning of the attack of appendicitis.

Almost all patients who died following operations had received cathartics or food by mouth after the beginning of their attack.

As a result of these observations I formulated a plan of treatment in 1892 which I have applied constantly since then to the present time. For a period of the first eight years I demonstrated this plan of treatment to surgeons who visited my clinic, treating all cases of acute appendicitis consistently in this way and admitting every case that applied for treatment without regard to the condition of the patient or the length of time that the attack had lasted. A number of my friends introduced the same plan in their clinics, and after having tested its merits and compared the mortality with other forms of treatment, I reported the method before the International Congress in Paris in 1900 and again before the Surgical Section of the American Medical Association in 1901; and many times since the latter date, insisting upon immediate operation in acute appendicitis, usually within forty-eight hours, while the infection is confined to the appendix, and carrying cases with spreading peritonitis by the so-called starvation method with rectal feeding and gastric lavage, described later, to a point at which they can be operated with equal safety.

The method was so radically different from that generally in vogue at that time

that it gave rise to very vigorous opposition, but one by one the surgeons with the greatest amount of experience have accepted the principles laid down at that time, so that at the present time I believe the plan has received practically universal acceptance, except among some of the younger men who are not familiar with the history of appendicitis.

In the meantime it has been but natural that surgeons here and there have not taken the trouble to read any of the original papers, and have misconstrued and claimed that the method opposes all operative treatment of acute appendicitis, while as a matter of fact from the first I have insisted upon an early diagnosis and an immediate operation in all cases in which the patient comes under treatment early enough to make it fairly certain that the infection is still confined to the appendix, and have objected only to operations in cases in which the infection had already gone beyond the appendix at the time the patient came under treatment.

The method provides a safe form of treatment also for this class of cases, so that it results in an enormous reduction of mortality in all forms of acute appendicitis.

The plan of treatment and its philosophy can be expressed most clearly in the following concise conclusions:

1. The mortality in appendicitis results from extension of infection from the appendix to the surrounding peritoneum, or from metastatic infection from the same source.

2. The extension may be prevented by removing the appendix while the infectious material is still confined to that organ.

3. The distribution or extension of the infection is accomplished by the peristaltic action of the small intestines.

4. It is also accomplished by operation after the infectious material has extended beyond the appendix and before it has been circumscribed.

5. Peristalsis of the small intestine can be inhibited by prohibiting the use of every form of nourishment and cathartic by mouth and by employing gastric lavage in order to remove any food substances or mucus from the stomach.

6. The patient can be safely nourished during the necessary period of time by means of nutrient enemata. Large enemata should never be given, for they may cause the rupture of an abscess into the peritoneal cavity.

7. In case neither food nor cathartics are given from the beginning of the attack of acute appendicitis, and gastric lavage is employed, the mortality is reduced to an extremely low percentage.

8. In cases which have received some form of food and cathartics during the early portion of the attack, and are consequently suffering from a beginning diffuse peritonitis when they come under treatment, the mortality will be less than two per cent if the peristalsis is inhibited by gastric lavage and the absolute prohibition of all forms of nourishment and cathartics by mouth.

9. In this manner very dangerous cases of acute appendicitis may be changed into relatively harmless ones of chronic appendicitis.

10. In our personal experience no case of acute appendicitis has died in which absolutely no food of any kind and no cathartic were given by mouth from the beginning of the attack.

11. The mortality following operations for chronic appendicitis is exceedingly low.

12. Were peristalsis inhibited in every case of acute appendicitis by the methods described above, absolute prohibition of food and cathartics by mouth and the use of gastric lavage, appendectomy during any period of the attack could be accomplished with much greater ease to the operator and correspondingly greater safety to the patient.

TO REDUCE THE MORTALITY FROM APPENDICITIS.

The following suggestions for the treatment of appendicitis are made with a view of reducing the mortality:

1. Patients suffering from chronic re-

current appendicitis should be operated during the interval.

2. Patients suffering from acute appendicitis should be operated on as soon as the diagnosis is made, provided they come under treatment while the infectious material is still confined to the appendix, if a competent surgeon is available.

3. Aside from insuring a low mortality this will prevent all serious complications.

4. In all cases of acute appendicitis, and in all cases of peritonitis, without regard to the treatment contemplated, the administration of food and cathartics by mouth should be absolutely prohibited and large enemata should never be given.

5. In case of nausea or vomiting, or gaseous distention of the abdomen, gastric lavage should be employed.

6. In cases coming under treatment after the infection has extended beyond the tissues of the appendix, especially in the presence of beginning diffuse peritonitis, conclusions four (4) and five (5) should always be employed until the patient's condition makes operative interference safe.

7. In case no operation is performed neither nourishment nor cathartics should be given by mouth until the patient has been free from pain and otherwise normal for at least four days.

8. During the beginning of this treatment not even water should be given by mouth, the thirst being quenched by rinsing the mouth with cold water and by the use of small enemata and by chewing wax or paraffin. Later small sips of very hot water frequently repeated may be allowed, and still later sips of cold water. There is danger in giving water too freely, and there is great danger in the use of large enemata.

9. All of these cases are greatly benefited by the use of continuous normal salt solution by rectum given by the very slow drop method according to Murphy's directions.

10. All practitioners of medicine and surgery, as well as the general public, should be impressed with the importance of prohibiting the use of cathartics and food by mouth, as well as the use of large enemata, in cases suffering from acute appendicitis or peritonitis.

11. It should be constantly borne in mind that even the slightest amount of liquid food of any kind by mouth may give rise to dangerous peristalsis and may change a harmless circumscribed into a dangerous diffuse peritonitis.

12. The most convenient form of rectal feeding consists in the use of one ounce of any of the various concentrated liquid predigested foods in the market, dissolved in three ounces of warm normal salt solution, introduced slowly through a soft catheter, inserted into the rectum a distance of two or three inches.

13. This form of treatment cannot supplant the operative treatment of acute appendicitis, but it can and should be used to reduce the mortality by changing the class of cases with spreading peritonitis, in which the mortality is very high, into chronic appendicitis, in which it is very low after operation.

14. It is important to bear in mind the fact that this treatment is always indicated in every case of acute appendicitis without regard to whether an immediate operation is or is not contemplated.

15. It is further important not to be deceived by the very rapid improvement of what appear to be serious cases after introducing this treatment into the belief that the case is not a gangrenous or perforative appendicitis, because such patients may easily be killed by giving food too early.

For a number of years we have placed all of these patients in the Fowler position, and have applied large hot fomentations of saturated solution of boric acid, held in place by an abdominal binder.

Over this dressing we have placed an electric light in the form of a so-called therapeutic lamp. These methods seem to add to the comfort of the patient.

The Use of Suction in Otolaryngology—Technique of Application[1]

BY ARTHUR J. WAGERS, M.D.
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Among the various agencies employed in the local treatment of suppurative inflammation involving the ear and the nasal accessory sinuses, suction occupies a high position in the scale of usefulness. Properly applied, it provides a most efficient means of obtaining physical cleanliness of the part being treated, and incidentally it produces a local hyperemia which, according to Bier, is of benefit in promoting healthy reaction in tissue exposed to the action of bacterial irritants.

Before taking up the details of application of suction, I wish to direct attention for a moment to the mechanism employed for the production of negative pressure.

There are in general use three types of apparatus—the suction pump operated by electricity, the Brawley suction apparatus for attachment to a water faucet, and the simplest form which consists merely of a rubber bulb which, after being compressed, produces suction by expansion.

Wherever current is available, the electrically operated pump will be found efficient for all purposes, the one objection to certain pumps on the market being that they are not provided with a ready means of regulating the pressure produced. The Brawley water suction pump has the advantage of being simple in construction, is light in weight, can be used wherever there is running water, and the pressure produced can be very easily regulated by controlling the amount of water passing through the instrument. The rubber bulb of course is ready for use at any time or place, but its use is limited by reason of the light pressure which expansion of the bulb produces.

Regardless of the type of negative pressure pump employed, the complete apparatus consists essentially of a rubber tube connecting the pump with any one of a variety of applicator nozzles which it may be desirable to use. A bottle reservoir should be interposed at some point between the nozzle and the pump. This serves the double purpose of showing the total amount and character of fluid removed and prevents this fluid from entering the pump.

The applicator nozzle, from the practical point of view, is the most important part of the mechanism. Nozzles are made of metal, hard rubber, or glass. I find glass preferable because one is able to determine almost immediately after application whether fluid in any quantity is being withdrawn, and its general characteristics may be noted at the same time. Sharp edges on all forms of nozzle are to be avoided, and if the nozzle is intended to fit tightly into any natural opening, as for example the external auditory canal or the nostril, it is advisable to protect the tip by means of a band of rubber. These nozzles as well as the rubber connecting tube are easily sterilized, thus rendering the apparatus available for any type of operation.

In the application of suction it must be remembered that negative pressure may be so great as to cause the patient extreme suffering. It is good practice to begin with the lowest possible pulling force, and let it be gradually increased until the desired results are obtained. Applied in this way it is but seldom that a patient will complain of discomfort.

A vacuum pressure gauge may be attached to the apparatus, but personally I do not find this necessary.

I shall now consider in some detail the practical application of suction in the treatment of certain ear, nose, and throat conditions.

[1]Read before the Philadelphia Laryngological Society, December 7, 1920.

Given a case of acute suppurative otitis media, we incise the membrana tympani to provide drainage from the middle ear. A certain amount of the contained fluid, being under pressure, flows into the external auditory canal; but complete removal of fluid can only be secured by applying suction. For this purpose a round, rubber-protected nozzle is inserted closely into the external auditory canal and the negative pressure allowed to act very gently. Even the lowest possible pressure may be painful if the operation is performed under local anesthesia or none at all. I recently heard a physician refer to this procedure in most uncomplimentary terms because he had seen a patient suffer severely from this method of treatment, and he therefore condemned it most heartily. To avoid this difficulty and for other obvious reasons it is better to operate under general anesthesia. But even then it must be remembered that too great pressure will frequently produce a hematoma in the wall of the external auditory canal. This is an undesirable occurrence, as by its presence it not only tends to obstruct natural drainage from the middle ear, but may itself become infected before absorption takes place. Daily removal, by suction, of the accumulated pus in the middle ear should constitute a part of the routine treatment of the condition.

Suction is quite as applicable in the treatment of chronic otitis media as in the acute condition and the technique is no different.

In the postoperative treatment of suppurating mastoids, suction may be employed to remove all pus from the wound. For this purpose it is advisable to use a nozzle of small caliber and long enough to reach all parts of the wound. I find that an ordinary curved tip medicine dropper answers the requirement exactly.

It is perhaps in connection with the diagnosis and treatment of nasal accessory sinus disease that suction finds its largest field of usefulness. At the same time the difficulties of application in this region are greater than those met with in treating conditions involving the ear or throat. I mention suction as a diagnostic aid because we sometimes examine a case in which all the subjective symptoms indicate the presence of an acute sinusitis, but inspection does not reveal the presence of pus in the naris. If there actually be pus in one or more of the sinuses, suction, properly applied, will bring it out into the nasal passage where it may be seen, thus confirming at once what might for a time at least remain a doubtful diagnosis.

Two general forms of nozzle have been devised for use in the removal of fluid from the sinuses: the one intended for direct introduction into the natural outlet of the sinus to be treated, and the other form consisting of a nozzle which fits closely into the vestibule of the naris, and through this the negative pressure acts indirectly upon all the sinuses in a manner to be explained later.

The method of applying a nozzle tip directly to the individual sinus has not been found practical in the writer's experience, for the reason that the natural openings of all the sinuses, except that of the sphenoid and posterior ethmoids, are hidden beneath the middle turbinate and are not easily reached except after removal of at least a portion of this body, and unless this operation is indicated for other reasons it would seem a needless sacrifice of tissue.

The indirect method of applying suction to the sinuses is practicable and efficient, but for its successful accomplishment we must take into consideration certain points in the anatomical construction of the parts operated upon as well as the physical laws involved.

In a recent discussion of this subject, the point was brought out that a fluid lying in a cavity will not be made to flow upward and out of an opening situated above the fluid level when a vacuum has been produced in that cavity. The speaker failed to understand, therefore, how suction could be used to empty certain of the sinuses. When we consider that with the exception of the frontal sinus, the natural outlet of practically all of the sinuses is situated at a

point above the low level of the sinus, we realize that the position taken was correct.

It is self-evident that a fluid flows more readily from an opening in the bottom of its container than from an opening in the side, and particularly if that opening happens to be above the fluid level, as can well occur in the case of the maxillary sinus, for example. It becomes evident, therefore, that to so incline the head as to bring the outlet of the sinus being treated to the lowest point favors the removal of fluid when suction is applied. In addition to this we must provide for two other conditions which are essential to the success of the operation. The outlet from the sinus must be sufficiently patulous to permit of the passage of air and fluid. Direct application of a solution of cocaine or adrenalin to the area about the opening will insure this condition. It is further necessary that the soft palate be elevated to close contact with the postpharyngeal wall. After a few trials the patient is able to do this voluntarily, but it is often necessary to assist by some such simple act as swallowing, and when the position of the palate has been attained the patient is directed to hold it while suction is acting. At the same time the suction nozzle is fitted closely into the nostril of one side, while the nostril of the opposite side is tightly closed by the operator's finger. As the negative pressure is applied, this is what takes place: a certain amount of the air in the nares and in the sinuses is suddenly withdrawn; that is, a partial vacuum is formed. As the air leaves the sinus a portion of the contained fluid is carried along with it and both air and fluid move in the direction of the nozzle. But in a moment all movement of fluid ceases although the vacuum be continued. If now the operator releases the unoccupied nostril there is a sudden and forceful inrush of air backward, around the septum, and into the opposite nostril, and its sinuses and the vacuum cease to exist. We now have the same condition with which we began. To continue the suction, we simply close the free nostril again, and the process as described is repeated until further operation fails to bring away fluid.

The procedure is the same for all the sinuses, bearing in mind the position of their respective outlets.

As the negative pressure often reaches the middle ear by way of the Eustachian tube, care must be exercised that the pressure be not so great as to injure that organ.

In the throat the use of suction is practically limited to its application to diseased tonsils and as a means of removing blood and secretions from the throat during nose or throat operations under general anesthesia.

When tonsils are distinctly diseased the rational indication is their removal. However, there are instances in which owing to the age of the patient, or because of conditions contraindicating the use of an anesthetic, it is not advisable to operate; and besides there are the patients who refuse operation. Such cases must be treated, and here again suction is of value as a means of cleaning out the pockets and crypts which have been opened at the surface.

The employment of suction for the removal of blood from the throat during operation has become so nearly universal in all our large hospitals, and the application is so simple, that there is little to be said except to emphasize its value. When efficiently employed it provides a clean field of operation, and, by preventing the asipration of blood and germ-laden secretions from the throat, undoubtedly serves to prevent a certain number of so-called ether pneumonias and the development of lung abscesses which have been observed in certain instances following tonsillectomy.

I do not wish to convey the impression that suction alone is a cure for suppurating sinuses or middle ears, though one does see a certain number of these cases which clear up in four or five days with practically no other treatment than suction. Neither can it take the place of surgery when surgery is indicated. But it is a principle of surgery

that whenever and wherever pus exists in the body it should be removed. Suction thoroughly accomplishes this removal, and in so doing carries away a multitude of bacteria and bacterial products from the area involved, and nature is thereby greatly assisted in restoring the tissue to its normal state.

A Comparison of Alcohol and Caffeine

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In the January, 1912, number of this journal the writer gave a brief report of a series of experiments on the influence of caffeine alkaloid on mental and motor efficiency in human beings. Recently opportunity was afforded to investigate, in the same careful way, the effects of alcohol in moderate amounts, such as may be consumed in the form of beer. In order to secure a more familiar basis of comparison, some of the same tests were used that were employed in the study of caffeine. This affords an interesting opportunity to compare the effects of the two substances on the same set of mental and motor processes, and the present paper gives a brief summary of such a comparison. Certain additional points bearing on the analysis of "idiosyncrasy" are also given, since these seem to have an important and far-reaching suggestiveness.

The subjects of the investigation were six adult males, who ranged in age from twenty-one to twenty-nine years, in weight from 106 to 182 pounds, in height from 64 to 75 inches, in previous alcohol habits from total abstainer to a regular user, and in initial morning pulse-rate from 66 to 92 beats per minute. They gave their whole time for a period of two weeks to the experiments, attempted at every trial to make the best possible record, gave thorough co-operation, and were in all respects an ideal experimental squad.

The doses used varied from 13 cubic centimeters to 118 cubic centimeters of alcohol. The alcohol was administered in the form of quantities of beer, containing 2.75 per cent of alcohol by weight. The dose was taken practically on an empty stomach at the usual lunch hour. Six tests of each type of process preceded the dose in the forenoon, and six tests followed the dose in the afternoon. On certain days a "control" dose was given, which was identical in all respects with the standard beer except for the removal of its alcoholic content. On one day, instead of alcohol or control doses, a heavy midday meal was given.

From the caffeine study the following tests were chosen for use. All of these, it will be seen, involve processes and acts which are grossly affected in what is commonly known as alcoholic intoxication. The degree to which they were affected in the present case will be seen from the comparison of the results with those secured from the caffeine doses and from the heavy meal.

Steadiness.—A measure of tremor in the extended arm. Measure the number of movements of a stated magnitude in one minute.

Rate of Tapping.—The number of taps in one minute made by a stylus held in the hand, using forearm only. Measure number of taps per minute.

Cöordination. — Number of bull's-eye strokes with hand stylus at three small holes arranged to form the corners of an equilateral triangle. Measure number of hits in one minute.

Color Naming.—Naming correctly a series of one hundred color squares, made up of the random occurrence of five primary colors. Measure time in seconds.

Naming Opposites.—Giving the antonym of each of 50 words occurring in random

order, the order changed at each trial. Measure time in seconds.

Calculation. — Adding 17 mentally and correctly to each of a series of 50 two-place numbers. Time in seconds.

In addition to these tests from the caffeine study, certain other processes were included. A *learning test* showing the ability to master a number-form code, changed at each trial, was one of these. A *memory test* for pairs of words unrelated to each other was also used. Records were also taken of *pulse-rate* over a one-minute period, at each round of the tests.

In a more detailed publication in another connection the full results may be presented. For the present report perhaps the most direct procedure will be that of comparing the level of efficiency in the forenoon (before the dose) with the level of efficiency in the afternoon (after the dose). The results may thus be stated in terms of gain or loss, in per cent of the forenoon efficiency. By comparing blank days with control days the effect of the control dose may be determined. Comparison of the control effect with that of the alcohol-beer will then reveal the effect to be attributed solely to the alcohol content. The effect of the dinner may be secured by comparing the results on that day with the results on the blank days.

In the following table are given the true effects of each of the main doses, when the control effect appropriate to each condition has been subtracted. The tests used in the caffeine study are here included, and the pulse-rate results are also given for alcohol and the dinner. It should be pointed out that the same subjects were not used in both alcohol and caffeine investigations. The caffeine data used here are from a squad of five subjects.

TEST.	Blank Days.	Control Days.	Dinner Day.	Alcohol Doses 40-50 Cc.	Alcohol Doses 66-79 Cc.	Caffeine Doses 3-4 gr.	Caffeine Doses 6 gr.
Pulse-rate	—7	0	24	8	10	..	..
Steadiness	11	—21	—61	—68	—241	—2	—583
Tapping	—2	0	8	—7	—13	3	4
Coördination	3	—2	—2	—6	—10	0	—4
Color naming	—6	—3	8	—2	—7	7	4
Opposites	—2	—7	5	—5	—12	5	6
Adding	—4	0	5	—10	—15	2	3

In the foregoing table a minus sign indicates a loss in efficiency, or at least a decrease in the score or rate. The figure in each case is percentage of forenoon efficiency, either gained or lost in the afternoon. In each case the records are "pure effects" —that is, the control results are the results of control doses in excess of the changes present on blank days. The alcohol and dinner records in the same way represent the effects in excess of the appropriate controls, and the caffeine results represent the effects of caffeine in excess of the effects of the control dose used in that investigation. Unless a minus sign is present the figure always means gain, except in the case of no effect, which is indicated by zero. The results show a degree of consistency from test to test and from individual to individual which the writer has never seen realized in previous drug experiments on human beings.

Comparison of the various sets of results is interesting, and shows in more concrete fashion than is ordinarily possible the difference between the various types of influence. The alcohol effects maintain the same direction and increase in magnitude with increase in dose. The alcohol effect on pulse-rate is considerably less than that produced by the dinner, and the control has no effect on pulse-rate.

The greatest effect of the alcohol in terms of per cent of the forenoon score is on "steadiness." All the agents, control, dinner, alcohol, and caffeine, produce unsteadiness. The unsteadiness following 40 to 50 Cc. of alcohol is quite like that following the dinner, and the effect of the larger alcohol doses is less than that produced by six grains of caffeine (the amount contained in about two ordinary cups of coffee).

In the case of coördination, color naming and opposites, the effects of control, dinner, both alcohol doses, and both amounts of caffeine are quite comparable

in amount, though often dissimilar in direction. The alcohol invariably produces lower scores, the caffeine higher scores, the dinner sometimes one, sometimes the other.

In adding and tapping the effects of the smaller and the larger alcohol doses are not unlike those of the dinner in amount, but are opposite in direction. These effects are also both larger in amount and different in direction, as compared with the effects of caffeine.

These results represent averages of the six subjects' records. All the individuals consistently give the same type of effect from alcohol, but they differ definitely among themselves in the degree of this effect. Two of the individuals are very susceptible, showing in all or nearly all tests effects from both small and large doses. Two individuals on the other hand show effects only after the larger doses. The remaining two individuals stand midway between these two pairs, showing less susceptibility than the first pair and more than the second pair. It is very easy to arrange the subjects in an order of susceptibility to the effects of alcohol. They show thus definite idiosyncrasy or individual differences in this respect. A detailed analysis of the factors involved in these individual differences has been made. Within the limits of the present paper it is impossible to give the figures on which the conclusions are based, since each point would require at least a page of figures, in addition to the description of the manner in which they were derived from the original individual records. It is hoped that in time it will be possible to make a complete publication, not only of the individual records in detail, but also of the basis of the following conclusions. For the present the study of idiosyncrasy yields a number of definite points of interest, which may be summed up here in the form of simple statements. It will of course be understood that these statements do not pretend to be generalizations capable of extension to all cases of idiosyncrasy to the effects of drugs. They apply to this group of subjects in their reactions to the alcohol doses. If it should later be shown that they indicate general tendencies in the case of other drugs, the facts will have a very general value, both to medicine and to psychology.

1. Idiosyncrasy does not vary with age, initial pulse, or previous alcohol habits.

2. Susceptibility to alcohol effects varies inversely with height, weight, and habits of regular and active exercise.

3. Susceptibility varies inversely with general competence. Those who are able to do superior work in the tests in general are less susceptible than those whose final achievement in the tests is relatively inferior. The correlation between general competence and susceptibility is .77, by the method of rank differences.

4. Susceptibility varies inversely with capacity to improve as the result of practice. Good learners are less influenced than are poor learners. The correlation between susceptibility and ability to gain through practice is .94.

5. Susceptibility to effects of alcohol in performance in the tests is inversely related to the effects of alcohol on pulse-rate. Those who are most affected in their work show least change of pulse-rate. Those whose pulse-rate is most conspicuously changed by alcohol show least effect in their work.

The following table shows for each test the correlation with rank order for susceptibility to alcohol in general:

TEST.	Correlation between final proficiency and general susceptibility to the effects of alcohol.	Correlation between ability to improve through practice and susceptibility to alcohol in general.
Steadiness	—.09	—.49
Tapping	—.77	—.55
Coördination	—.09	.37
Substitution	—.77	—.60
Color naming	—.83	—1.00
Opposites	—.83	—.71
Adding	—.71	.43

As is well known, such tests as those here used are commonly employed as measures of general competence or intelligence. Further, there is reason to believe that final ability, after practice, as here employed, is a still better measure of general intelligence than are initial records. Moreover, ability to improve through experience—that is, learning ability—is also closely related to general intelligence.

In another connection (Psychology of

Functional Neuroses, D. Appleton, New York, 1920) the writer has shown that general intelligence is a very important factor in determining the manifestation of psychoneurotic symptoms. The caffeine data, not yet fully analyzed in this respect, also strongly suggest that it is the relatively incompetent who are most susceptible to the effects of the drug.

The mechanism which produces these results and their significance in the nervous and mental make-up of the individual may well constitute the incentive to speculation. But whatever explanation be accepted, the results, both for experiment and for practice, in connection with drug effects and neurotic complaints, have a far-reaching importance. If it should be ultimately shown that these results can be generalized, and that *idiosyncrasy* to drug effects, that vague term which covers a great lack of knowledge in pharmacology and psychology, is in part at least a function of general intelligence, this will be worth knowing. Taken in connection with the demonstrated relation between general competence and the functional neuroses, such results will go far toward realizing Kraepelin's early hopes of the future of pharmacopsychology.

The Ebb and Flow in the Tide of Harmful Indulgence

BY THOS. S. BLAIR, M.D.

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Man has a wonderful recuperative power, biologically, intellectually, and even spiritually; he is remarkably adaptive to environment, and harmful indulgence leaves less mark upon the race than moralists would have us believe. Mass indulgence is all but fatal, whole civilizations having gone down under the corrosion of lewdness, with its attendant pathology; and certain races lack in stature and attainment through the moral decay induced by evil indulgence. Yet it must be admitted that the physical effects of harmful agents overindulged are more quickly recovered from than are the ethical and spiritual decay induced by them. "The survival of the fittest" is more a physical truism than a moral or mental one, for the physically weak die off by virtue of natural law, while the mental and moral degenerate may long survive and propagate his kind to the upbuilding of a race or nation of low ideals and wretched habits.

Harmful indulgence has its ebb and flow. Were this not true the race would long since have seen its declension into a permanent dark-ages status. Even war, with all its horrors, never serves for long to blot out the better side of human propensity. The pendulum of civilization swings from one extreme to the other, and the wheels continue to go 'round and 'round despite the manifest evils of the left that serve to drive the pendulum back again to the right, with a certain longer normal between the extremes. Among savage and uncivilized races there is stagnation, neither extensive harmful indulgence nor uplift periods of physical and moral regeneration. The real benefits, therefore, are more with the civilized peoples than with the savages, and this despite the accentuation of harmful indulgence among the former. So, then, we should not overstress harmful indulgence; it is productive of its own antidotes from the physical side, and the real function of the moralist is not to blot out all indulgence and all sin, but to neutralize their effects by building up a moral and religious power of resistance, thus raising the ethical opsonic index, as it were, of the people. The Garden of Eden experiment failed; but if it had not failed we have no guarantee that man would have been more than a mere neutral influence in the world. Having no sin or harmful influences to

fight, he would have become soft and mediocre. It is futile to urge absolute elimination of all that is harmful in this world.

There is a certain normal incidence of harmful indulgence that may not be suppressed. Overeating, late hours, foolish types of dressing, and many other excesses are harmful; but indulgence brings its own punishment. It is futile to endeavor to limit man to the strictly necessary, and such relatively innocuous indulgences as drinking coffee and smoking tobacco must be condoned if not excused, and this despite the fact that coffee and tobacco are often harmful. Yet many persons are not willing to stop there. Certainly it is not wise to encourage the excessive use of caffeine taken as an indulgence, bringing more prompt response than will the drinking of coffee which contains caffeine; and who would think of isolating the active principles of tobacco and encouraging people to indulge in them in the place of smoking?

The more harmful ways of using tobacco, its adulteration with harmful agents, its sale to adolescents, etc., are proper things to regulate; but to become fanatical over these minor indulgences is neither wise nor conservative of good manners and morals.

After all, two factors tend to produce extremes in indulgence, and they are: commercializing the harmful indulgences and prostituting science to increase their hazards. The sex urge is normal and productive of an excess of good over the evil that may, under normal conditions, be associated with it. A certain minimum of sex vice is inevitable, but that minimum does not warrant vows of celibacy or undue interference with the rights of the individual to propagate the species. It *is* right, on the other hand, to deny sex indulgence to the person with syphilis or gonorrhea and to establish the civil and religious institution of marriage and the family. But vice, which must be expected in some degree, when commercialized becomes wholly an evil, and commercialized vice should be suppressed by wise and constructive measures.

Indulgence in alcohol may always be more or less harmful, but so long as the natural fermentation of fruit juices productive of mildly alcoholic drinks was the only resource for indulgence of the taste for alcohol relatively little harm resulted; but man was not satisfied with what nature produced for him and he commercialized the wine business, fortifying the wines with additional alcohol, distilling the spirit from them and producing brandy, blending wines, adulterating them, etc., and creating of natural wine so-called improvements that were unnatural and harmful. To this science contributed, producing a host of concentrated alcoholic liquors, which the commercialist exploited, finally building up a business that became a menace to society.

Naturally, society protected itself by more or less drastic legislation or prohibition. From the standpoint of society at large absolute prohibition was justified, probably not from the biologic or ethical point of view, but because of the evil commercial exploitation that it seemed could not be controlled by regulation and that society determined must be destroyed. Realizing that there are certain medicinal and other proper uses for alcohol, certain exemptions and exceptions were incorporated in the laws designed to enforce prohibition in the United States.

The first difficulty to be confronted was the fact that biologically and ethically prohibition was a device that "dropped a monkey-wrench into the machinery." This, in my view, is not a very serious matter, since it is self-adjusting, and after certain adjustment the prohibition machine may be made to work smoothly—that is, if the "fanatics" are controlled and the work of enforcement is properly oriented. It is not the absolute suppression of alcohol that society is demanding in this country, but the destruction of the discredited commercial liquor business and the prostituting of science in the production of unnecessarily strong and improperly used alcoholic liquors.

But the "fanatics" are not going to be controlled until after the complete suppression of the evil commercial system that

profited by making drunkards of our people. We may as well face this issue.

Incidentally, in the work of this bureau, we become rather intimately informed about the status of alcoholic abuses under the degree of prohibition now existent in this country. Without in the least being warped by personal view, and going purely by the law and the evidence, we are in position to express some views regarding the question, more especially as relates to Pennsylvania.

Perhaps it may be said that we are suffering from an overdose of antidote administered without first eliminating the poison for which the antidote was given, the result being that the patient is suffering from both the poison and the antidote, the poison being camouflaged and the antidote unnecessarily nauseating.

Knowing that there is no scientific justification for man to imbibe the concentrated alcoholic liquors produced by distillation or reënforcement, and that if such products are used medicinally they should be diluted, the writer has long held to the view that the manufacture and distribution of such intoxicants should cease; but he also was inclined to make the concession to others who advocate light wines and malt liquors (which he does not personally advocate or use) that their manufacture and distribution might continue, at least for a period of years, without serious menace—that is, if they were honestly made under rigid pure-food regulations and vended unobjectionably.

The difficulty in such reasoning was the fact that the commercial factor was not duly considered. Our experience in this bureau has forced the conclusion that the "fanatics" before referred to knew the commercial liquor business better than we did, and had formed a more exact estimate of how it would deport itself under prohibition than we had formed.

This bureau knows that Jamaica ginger and other medicinal preparations of high alcoholic content are now being sold in grocery and other merchandising stores, bootlegged, etc., to a degree that exceeds hundreds of times over the legitimate sales of such products in drug stores, and they are being used principally for purposes of intoxication and the trade catered to by certain erstwhile liquor dealers.

It may astonish physicians to hear that we have ascertained the fact that Hoffman's anodyne and Hoffman's drops are being used as intoxicants to probably a thousand times the degree that they are used medicinally, principally among miners of foreign birth. These miners, especially the Polanders, drink ether regularly as an indulgence, and we have found drug stores buying ether in lots of one hundred to two hundred pounds, and alcohol by the barrel, to make up Hoffman's drops (approximately one-third ether and two-thirds alcohol) to sell to miners. This trade was largely suppressed by this bureau, when it was at once taken up by the grocery trade. Recently, in the Panther Valley, a mining district, we found at least a carload of Hoffman's drops put up in one-and-one-half-ounce bottles for sale in the wholesale and retail grocery establishments of the valley. This is used by adding to coffee, and is consumed to the point of intoxication, frequently a whole bottle at one dose. Miners other than the Polanders evaporate off the ether content and drink the remaining alcohol. Many accidents in the mines are directly due to this form of indulgence, the mining companies are much concerned over the matter, and this bureau is endeavoring to stamp out this trade. Such is one of the fruits of exemptions "for medicinal use" in the Volstead Act.

Another "medicinal" exemption has resulted in the market being flooded with so-called "wine" tonics, some of them duly medicated, but large numbers of brands being nothing but cheap California wine reënforced with alcohol, and perhaps a trace of gentian or taraxacum. These are nothing but "booze" pure and simple, and these products are being sold in the aggregate literally by the trainload, resulting in much intoxication.

The writer has counted as high as twenty-nine different kinds of "medicine"

displayed and on sale, along with near-beer, in the saloons or bars of Pennsylvania. All sorts of "vinos," "vins," "cordials," "tonics," "bitters," "bitter wines," "ginger extracts," and other "medicines" are offered for sale in these places, and the great bulk of them are consumed for purposes of intoxication. They are all alike in one regard; their alcohol content is high.

Some deaths and numerous cases of illness have come to our attention, due to the popular use of such "medicines" as beverages, the illness being induced by the exceptionally low grade of wine or liquor in these products, and not from any active drugs contained. We could point out communities where intoxication is now more general than before the Volstead Act became effective, a great part being induced by these camouflaged "medicines."

This flow in the tide of harmful indulgence is to be laid wholly to the door of the commercialist. Doubtless, in time, such abuses will be eliminated, but not adequately before "medicinal usage" is more clearly defined in the law, or the Volstead Act so amended as to crush out the commercialism that only wants an inch to take a mile, and that will, on the slightest opportunity, negative all law and all decency purely to make money by catering to human weakness.

Such conditions, as well as others to be referred to under the consideration of harmful indulgence in narcotics, have very definitely impressed us with the view that the main thing to accomplish by law is the complete suppression of the liquor business, as such, removing from it all legal and political support, taking away from it all profit, and rooting out from the proprietary medicine business all domination or control by the liquor trade under a mask. Extreme agitation by "fanatics" will not cease, and should not cease, until after these ends are accomplished. Propagandists go to extremes, it is true, but so do commercialists.

True, half-hearted enforcement of the Volstead Act, as well as official winking at abuses, are responsible for liberating from bond alcoholic liquors in excess of the provisions of the law; and it is also true that adequate and impartial enforcement will alleviate the situation in time. It must be admitted that, thus far, especially in large cities and in sections populated by foreign laborers, prohibition has been a very dubious success, if, indeed, it can be called a success at all. Better far to have honest wine and beer than dishonest "medicines" that are only low-grade booze!

Yet, what the newspapers do not report, there are large sections wherein prohibition is relatively well enforced. These communities are not played up in the press; but this bureau knows of them, and it must be fairly acknowledged that prohibition is certainly a blessing in these places. None of the direful results of prohibition prognosticated by its opponents are in evidence in these favored communities.

The writer never has regarded alcohol as of importance from the medicinal point of view, and he has rarely prescribed it except for the aged and for patients seriously ill who have been accustomed to regular use of intoxicants and whose recovery might be jeopardized by shutting off an indulgence to which the patient has been habituated. Yet he recognizes the fact that more able physicians often disagree with him, and he is broad-minded enough to concede to the individual physician the right to determine for himself what attitude he should take in this matter. Certainly, as an official concerned with the problem of harmful indulgence, it is not within his province to endeavor to impress personal view that may be regarded as extreme by many able clinicians. Yet we should have some rational standardized basis for therapeutic usage of alcohol that would meet with general professional and legal support in place of mere bureaucratic rulings concerning just how much liquor may be prescribed for a sick man and just how long that supply should last. The medical profession may be trusted to regulate this matter, with perhaps some abuse here and there; but the medicinal usage of alcohol should be entrusted *wholly* to the medical profession, not to the proprietary medicine interests or

the liquor trade masquerading as makers of medicine. It seems to me that the whole profession can agree on this matter, thus eliminating mere commercialism from the medicinal usage of alcohol. It may be stated that the legitimate proprietary medicine interests would not be injured in the least by such requirements.

At present harmful indulgence in alcohol is at ebb tide, but with too much back-wash that brings up the dirty side of such indulgence. Just how long this ebb tide will last no one can foretell; it is dependent on too many factors. We are trying a great experiment and the trial should be an honest one, the law be duly enforced, and very careful scientific observations made. It must be admitted that people can get along very well without alcoholic liquors, just as they could get along without tobacco and coffee; but exactly how far prohibition in any of these agents should be carried, as the *final* policy, can be determined only by trial. The matter is not an academic issue, and it must be admitted that any reform can defeat itself by the enforcement of narrow policies.

It seems to the writer that science should rule in the final determination; not a commercialized science, or any type of paid-for science, or even propaganda determination, but the patient, scientific study that has served to solve many problems in the past —an unbiased and long-continued study of the problem in all of its bearings, with controls, and in which the laboratory worker, the clinician and the sociologist should join forces.

Harmful indulgence in narcotics of potent nature, such as opium, morphine, heroin, and cocaine, and potentially harmful somnifacients, such as hydrated chloral, hyoscine, and some of the synthetic products, is in a different category from the more social indulgence in coffee, tobacco, and mild alcoholic beverages. Other than in proper medicinal usage, these agents are wholly bad—admittedly bad.

Figuring all of the opium alkaloids to an opium basis, the hospital usage of them in Pennsylvania shows a yearly per capita of about three grains. That is, a hospital treating three thousand patients in a year uses about nine thousand grains of opium, or alkaloids of opium representative of that amount of the crude drug. On the other hand, the yearly per capita usage of opium in Pennsylvania, counting every man, woman, and child in the State, is twenty-four grains, which is eight times the hospital per capita, and largely due to unwise exceptions and exemptions in the laws. This, of course, predicates abuse—an abuse that may not be condoned and that should be rigidly suppressed. On this proposition I am sure the medical profession, as well as all honest citizens, are agreed.

But if we are to blot out the more harmful indulgences from society, which it is admitted we should do, is it wise to endeavor to sweep out of existence every minor form of abuse that may become harmful if carried to the extreme? The moralist says yes. Is he correct in this view? Again, is it wise *suddenly* to legislate a long-indulged habit out of *legal* existence, whatever may be said of its *actual* status? These questions are more or less academic, and, as has been pointed out, prostituting science and overexalting commercialism has been responsible for popular efforts at sudden suppression of certain things.

It seems to the present writer that the medical profession may well take ground against the prostitution of science. Chemistry was responsible for many of the horrors of the late war. Have we any evidence that the chemist effectively raised his voice in protest over the use of poison gas and unduly vicious explosives? Since prohibition has come in, certain psychopathic inebriates have rushed to synthetic analgesics and hypnotics for relief, and many have been killed by taking overdoses. Aside from warning issued by the New York City Department of Health, what protest has been made against this dangerous practice?

It is not a tenable position for the medical profession at large to push off on the departments of health the whole propa-

ganda against such abuses, be they alcohol abuses, narcotic abuses, or the abuse of other drugs. Propaganda is the necessary result of the lack of action. If action is taken at the first sign of danger, propaganda becomes a very minor need. Simply allowing an abuse to proceed to dangerous lengths, until the discriminating public is aroused to the danger, makes propaganda necessary; and propaganda may go to too great lengths, forcing the doing of many things unwisely in order to meet a situation that should not have arisen.

To show what propaganda does, and how a victory is won by propagandists, even though the victory be of far-reaching benefit, since prohibition has been enacted into law certain enthusiasts are continually endeavoring to impress upon this bureau that it is its duty to begin a crusade against the cigarette and other forms of tobacco, against soda water, and even against chewing gum. We are asked to suppress vaccination, the use of "rotten horse juice," as serums are called; to be against calomel, acetanilide, aspirin, all forms of cosmetics, and everything under the shining stars that some fanatic thinks ought to be crushed out of existence simply because he does not believe in them. Sweet reasonableness is no part of the creed of the fanatic.

There is an ebb and flow in the tide of harmful indulgence; and taken at the flow it leads, not to fortune, but to a great propaganda that produces some good things and, as well, some harmful ones. The scientific method is to induce an ebb in the tide of harmful indulgence, and then, having reached low tide, to crush it before it gains momentum for a return to high tide.

This is the policy we should pursue as regards all *new* menaces. For instance, ether drinking is a new menace in this country imported from Eastern Europe. We should crush it before it becomes much of a problem. Smoking cannabis leaves is a South American vice that makes the smoker go insane within a year or two. It is being introduced into this country, and we should ruthlessly crush it before the habit spreads here. Taking veronal as a substitute for alcohol is just beginning to show itself as a vice. Veronal is a useful drug but a dangerous indulgence, and we should crush out its improper use as promptly as possible.

And as to the *old* harmful indulgences, we should try to induce a low tide, and then keep it there. If the indulgence is wholly harmful, then, having induced a low tide, it may be well to crush it out of existence. But this thing of attacking a high tide with a broom is poor policy, for that is no time for a clean sweep. Perhaps the building of a legislative dyke or sea-wall is the correct method; but dykes leak and sea-walls require constant repairs. They are good so far as they go, but the scientific method is to gain ground by attacking the menace of the sea at low tide and in fair weather..

Note.—Since the above was written the alcohol permits of many hundreds of manufacturers of so-called "medicine" have lapsed, and the authorities in charge have refused to renew them. This official attitude should be given earnest support by the medical profession, since there promises to be a vicious legal fight against the Washington rulings.

Intracistern Injections of Salvarsanized Serum in Neurosyphilis.

McCUSKER, in the *Boston Medical and Surgical Journal* of October 21, 1920, states that since the beginning of the use of salvarsan therapy they have at the Butler Hospital of Providence, R. I., made a special effort to overcome the previous unfavorable results in neurosyphilitic treatment. Intravenous, intraspinous, and intraventricular methods have been used. At first intravenous therapy alone was the rule. Later on the method of Swift-Ellis was adopted. In 1916 a publication was issued from the hospital on this latter method of treatment in general paresis and great results were predicted. A separate publication will show the unfavorable end-results in these cases.

They have also tried intensive intravenous therapy with routine lumbar drain-

age of the spinal fluid. On several occasions intraventricular therapy has been used.

Every one of these methods offered hope at first, but their statistics show that they were disappointing in their results. The introduction into the ventricles of salvarsanized serum was the most promising, but this necessitated trephining and was not resorted to in early cases on account of the disfiguring trephine scars. It still has merit.

The excellent work of Ayer and others in showing the ease with which the cisterna magna can be drained in meningitis and other diseases opens up a new avenue of approach in the treatment of neurosyphilis. He has attempted, therefore, cistern puncture with the replacement of the fluid by diarsenolized serum.

He presents the following case, by way of preliminary report, to show the application of the method and with the hope that it may stimulate like work by others. The case selected is that of a patient who has a definite history of syphilis of long duration and who, in addition to the routine treatment following the primary lesion, had intraspinal therapy several years later for the relief of tabetic pains. For the past several years he has had treatment at one of the favorite springs. At the present time his blood Wassermann is negative and the spinal fluid Wassermann is four plus. In addition to these serological findings he also has somatic signs of neurosyphilis.

On account of the patient's activity, light chloroform anesthesia was used. The patient was placed on his side and his head flexed on his chest, with the occipital protuberance on the same horizontal plane as the spinal column. An ordinary lumbar-puncture needle of 18-gauge and graduated in centimeters was used. The technique used in the puncture is the same as that in use by Ayer at the Massachusetts General Hospital.

By palpation with the thumb a depression may be felt below the occipital protuberance in the median line. By pressure the spine of the axis may be palpated, and just above it "a definite soft spot may be felt," which is the area between the lower margin of the base of the skull and the spine. With the thumb of the left hand pressing firmly into this depression, the needle in the right hand is introduced into the skin in the median line of the back of neck and in the space between the base of the skull and the axis. The direction of the needle is slightly upward and in the line of a plane passing through the glabella and the upper edge of the external auditory meatus. As the needle is pushed forward the resistance of the dura and of the posterior occipitoatlantoid ligament, which extends between the posterior margin of the foramen magnum and the posterior arch of the atlas, is felt plainly and is to be overcome. With the needle inserted at a distance of 5 cm. fluid is obtained. After estimating the pressure (140 mm. in this case), 15 Cc. of fluid was withdrawn and 15 Cc. of diarsenolized serum was introduced slowly by the gravity method. The patient recovered from the anesthesia while on the table and has suffered no ill after-effects.

Cadaveric and living experiments have shown that a needle inserted to a depth of 4 to 5 cm. would enter the cistern and allow over 1 cm. clearage of the medulla.

To some men occipito-atlantoid puncture may appear as a radical procedure, but in the light of the experimental work of Ayer, Wegeforth, and Essick, at the Army Neurosurgical Laboratory, and of the practical work of Ayer at the Massachusetts General Hospital, it appears as a procedure with a percentage of danger no greater than that in lumbar puncture.

McCusker summarizes his paper as follows:

1. Cistern puncture offers another route of application in the method of therapy in syphilis of the central nervous system.

2. It gets the serum nearer to the seat of the disease.

3. It is easier to accomplish than a spinal tap.

4. It offers no more danger than rhachicentesis.

Editorial

GLUCOSE IN THE TREATMENT OF PNEUMONIA.

When physicians recognized, many years ago, that different cases of pneumonia varied to an extraordinary degree as to severity, they did not know that this difference was largely dependent upon the fact that in one instance Type I or II or III of the pneumococcus was the cause of the illness, whereas in the mild cases Type IV was the chief factor. They did, however, recognize that the severity of the illness was often dependent upon the condition of the patient at the time that he was stricken, and they knew that where there was an underlying diabetes or nephritis the prognosis in any case was far more grave than when pneumonia attacked a seemingly healthy man.

It was hoped when the first three types of pneumococcus were first differentiated that this would be the pathway by which an antipneumococcic serum might be prepared which would be as efficient as is the antitoxin for diphtheria. Up to the present time it has not been possible to prepare a serum which offers any assistance in infections by Type II or III, although reports as to its use in pneumonia due to Type I have been encouraging. Nevertheless the speedy onset and development of the disease and the lack of a trained technician to determine the type of infection, combined with a delay in obtaining the serum even if Type I is recognized, prevents the use of this specific remedy in the vast majority of cases, and the reaction which develops in many patients after it is injected intravenously (for, as is well known, it must be given in this way) doubtless has made many physicians hesitate before employing it in another case.

The result of all these influences is that our treatment of pneumonia is still very largely symptomatic and promises to remain so for a long period. While no specific form of treatment has been developed, nevertheless every additional measure which seems to promise value, particularly if it aids the vital forces of the patient in combating his infection, should be sufficiently tried to determine its value, and if experience indicates great usefulness it should be generally employed.

Many physicians do not recognize the amount of physical stress to which a patient is subjected when suffering from this disease, entirely apart from any toxemia which may arise from the infecting organism. The rapid respirations expend an amount of energy which is difficult to estimate. If any person in health sits by the bedside of a pneumonia patient with rapid respirations and attempts to voluntarily keep pace with his breathing by means of his own respirations, he will be surprised how soon he becomes fatigued, and while in true croupous pneumonia the pulse-rate is not increased as it is in most acute infections, nevertheless the labor of the heart is materially greater than in health. At the same time the patient, because of his fever and for other reasons, is unable to take his ordinary food, which, if he were carrying out voluntary exercise, he would soon demand, and so before many hours have elapsed his physical exhaustion diminishes his vital resistance to such an extent that he can offer but little resistance to the infecting germ.

The use of stimulants simply increases the expenditure of his energy as the whip increases the expenditure of energy in a tired horse, and therefore any measure which looks to the supplying of a foodstuff in such a form that it can be readily utilized demands attention. For a number of years those who are chiefly engaged in caring for sick children have been resorting more and more to the intravenous, or even intra-abdominal, injection of solutions of dextrose or glucose, particularly in cases when the condition of the alimentary canal is

such that feeding by normal methods is impossible.

In the *American Journal of the Medical Sciences* for October last, John reports upon his experience with the intravenous injection of glucose in the treatment of pneumonia in an army hospital. He states that he has employed it more than one thousand times without seeing a single instance where the effect seemed to be disadvantageous. He employed, as a routine measure, 250 Cc. of a 10-per-cent solution of glucose, adding to it a small quantity of morphine, atropine, and about 15 minims of the tincture of digitalis. The immediate results which follow such injections are in his experience a sense of increased comfort on the part of the patient, who often drops asleep and obtains immediate rest. There is also a fall in temperature varying from one to three degrees, a greater flow of urine through the kidneys, and a better secretion by the skin, accompanied by a slowing of the heart and an increase in the pulse volume.

John considers carefully various experiments which have been made by investigators as to the quantity of glucose which can be given intravenously within a given space of time without developing a glycosuria, and quotes Erlanger and Woodyatt, who found that as much as 10 to 12 grains of glucose per 2½ pounds of body weight may be injected per hour before sugar appears in the urine. While their researches were in animals, John points out that this would be equivalent to about two pounds of sugar per day for a man of average weight. In John's testing of this method of treatment, he found that more than two injections per day were rarely necessary and sometimes only one. Care, of course, must be taken that distilled boiled water is used to make the solution. In some instances a chill follows the injection just as it follows any other venous injection, but this has never in his experience been followed by other disagreeable symptoms. He did not find that the injection produced hemolysis, and he believes that it adds very materially to the nutrition of the patient.

John's report is the more interesting because it is manifest that a very considerable number of his patients belonged to Type II, which ordinarily has a high mortality.

Experiments which have been made as to the value of sugar in its ability to increase the strength of the heart in soldiers on the Continent of Europe during the great war indicate that it is a very efficient supporter of this organ. Of course it is wise not only to use distilled sterilized water, but to sterilize the solution after the glucose is added. The injections are given, as is any intravenous injection, either by means of a gravity apparatus or a 10-Cc. syringe with a three-way stop-cock.

In concluding his paper, John states that Mosenthal has called his attention to the fact that ordinary commercial glucose is found to be preferable to the chemically pure product so-called, because in the purification of commercial glucose traces of acetic acid remain, and it is suggested that these traces are responsible for some of the chills that follow the injection, since in Mosenthal's experience commercial glucose failed to produce chills, while so-called "chemically pure" glucose did so.

The question arises as to whether in some instances where intravenous injections are deemed unwise, it will be proper to resort to the intra-abdominal injection method, which, it is to be remembered, consists in introducing a hollow needle just below the navel and injecting from 250 to 500 Cc. at body temperature. This has been done frequently in the treatment of children. In the October issue of the *American Journal of Physiology* there is a communication by Cunningham in which he details experiments made upon animals to determine what the effect of such injections is upon the mesothelium of the abdominal cavity, his general conclusion being that the effect is stimulant and not destructive.

When the digestion and assimilation of ordinary food by the stomach is difficult or impossible, this glucose method would seem to be indicated to maintain nutrition.

THE VALUE OF SQUILL AS A CARDIAC STIMULANT.

For a good many years it has been recognized by pharmacologists and physicians that squill was closely allied to digitalis in its influence upon the heart muscle. It has also been recognized that in an overdose it was somewhat irritating to the kidneys, and that partly by this kidney effect and partly by its cardiac effect it would sometimes act more advantageously in cases of cardiac dropsy than would digitalis.

For half a century physicians have been in the habit of prescribing in cardiac dropsy a pill containing a grain of digitalis leaves, a grain of powdered squill, and a grain of calomel; in other words clinical therapeutics indicated that the squill acted as an adjuvant to digitalis in this condition. There have been, however, no very thorough studies to determine the exact influence which squill could exercise upon the heart muscle —such studies as are made with the newer instruments of precision; and, therefore, an investigation carried out by White, Galboni, and Viko with the aid of the electrocardiograph deserves attention. Unfortunately the number of patients that were studied is not as large as is to be desired before reaching definite conclusions, but they seem to have proved that while squill emphasizes the effect of digitalis and acts in a manner closely allied to it, it is a much more feeble drug in its influence upon the heart muscle, and for this reason is probably of little value as a cardiac stimulant in the doses in which it is commonly employed. It is to be recalled, however, that the cases in which they employed this drug were severe, in the sense that a number of them had auricular fibrillation.

So far as the electrocardiographic records are concerned, they found that full doses depressed, flattened, or inverted the T wave, as does digitalis, and that heart block might be produced by large doses. It is also interesting to note that even when they employed doses far in excess of those commonly used, toxic symptoms were not marked or occurred with great rarity. By large doses they mean from 2 to 4 drachms at a dose instead of 15 minims of the tincture, which is the dose most commonly employed when squill is used in a tincture form.

It is also interesting to note that they did not find that squill increased the urinary flow, except in two cases of edema, and this after the drug had so reduced the pulse-rate as to be noticeable in its effect. These two cases, however, were distinctly dropsical, and the supply of fluid in the tissues provided an adequate reservoir from which fluid could be obtained for diuresis, whereas in the other cases which had no edema, no such reserve of fluid could be called upon.

This electrocardiographic study, therefore, confirms the views held by most practitioners heretofore, namely, that squill produces a digitalis-like effect far less powerful than foxglove, and that it cannot be used as a substitute for foxglove unless the doses are so large as to be irritating to the kidneys if perchance they are already inflamed.

DECAPSULATION OF THE KIDNEYS.

Readers of the THERAPEUTIC GAZETTE will recall that not very long since we called attention to a series of cases reported by Morse upon the employment of decapsulation of the kidneys in nephritis occurring in children, and our readers will also remember that on a previous occasion we called attention to the work which was done by Edebohls and others along these lines, expressing the opinion that a resort to this operation in the majority of cases is unwise, although it is true that in a certain proportion it had seemed to do much good.

The difficulty has been to determine the type of case in which such an operation should be resorted to, and it would seem on general principles to be fairly clear that little can be expected of decapsulation in

chronic contracted kidneys and but little more in chronic parenchymatous nephritis, unless the disease has existed a comparatively short time and there is reason to believe that a sufficient amount of secreting epithelium is still left which, when relieved of pressure by decapsulation, may once again functionate. In this connection our readers will be interested in a communication made to the Section on Urology of the Royal Society of Medicine of London by Horder in October, 1920, the cases being also reported in the *British Medical Journal* of November 13, 1920. As Horder points out, many of the earlier cases that were operated on, though called cases of Bright's disease, were evidently not so, and he adds the sapient words "the data have not yielded definite indications for the operation."

At first simple puncture was resorted to, then kidneys were incised, then they were decapsulated, and later on surgeons became more bold and have decapsulated both kidneys at the same operation.

In Horder's report there are four cases. The first two are quite remarkable and were highly successful in their end results, whereas the second pair were only partly successful. In the first instance, a woman of thirty came under observation in 1914, with a history of swelling of the legs and thighs, which began four months previously and gradually increased. She had dyspnea on effort and some vomiting. There was nothing in her previous history to throw any light upon the origin of her illness, but she presented the picture of so-called parenchymatous nephritis, passing about 30 ounces of urine in the twenty-four hours, with a specific gravity of 1.015, a considerable amount of albumin with granular and epithelial casts, and a blood-pressure of 120 mm. There was no thickening of the radial arteries and the heart was normal. Under ordinary medicinal treatment the patient was discharged relieved about six weeks after she was first seen. Nine months later she reported that she had been fairly well until six weeks previously, when she noticed a return of the swelling. She was found to be more anemic and more edematous than on the previous examination. There was some ascites, the urine amounted to only 20 ounces, with specific gravity of 1.020, and casts were abundant. As she did not improve under six weeks of ordinary treatment, both kidneys were decapsulated. The capsules were more adherent to the kidney substance than is normal, both kidneys were a little large, slightly mottled, but certainly not pale. The patient made an uninterrupted recovery from the operation, an improvement in the secretion of urine and in the edema and albuminuria beginning at once, so that after the second week there was no edema, the urine secretion was normal and only a trace of albumin was present. Six weeks after the operation the patient was discharged quite free from edema, with no albumin and no casts. Five years later the patient consulted Horder to get advice as to whether she could get married and go to live in India. At this time he found no signs of disease and she seemed to be in most excellent health. There was no albumin in her urine, no casts, and it was of good specific gravity.

The second case was one in a child, aged ten, who developed albuminuria and dropsy six weeks after a slight sore throat. Notwithstanding ordinary treatment for acute nephritis the symptoms got worse, so that by the end of the second month the urine was scant, loaded with albumin, casts were abundant, and dropsy universal. There was constant febrile movement, attacks of vomiting, headache, and drowsiness. At the end of six months the child's state was most unsatisfactory, the serous sacs containing fluid, and paracentesis abdominis was practiced on two occasions. At the end of the seventh month decapsulation of the kidneys was resorted to under gas and ether with oxygen. The operation was

completed in thirty-five minutes, a great deal of fluid escaping from the lumbar incision. There was no difficulty in stripping the kidneys, which were found to be pale, mottled, and large in size in proportion to the child's age. The kidney substance was apparently not under any tension. The wounds healed well and there were no untoward after-symptoms. Free urinary flow was established almost at once and the edema rapidly diminished. Six months after the operation the patient was found to have slight edema of the face and feet at times with some albuminuria. Fifteen months after the operation there was an attack of nausea with slight increase in the edema and albumin. This flareup, however, was thought to be due to septic tonsils, which were removed three years after the decapsulation, and this procedure seems to have completed the girl's recovery, for since June, 1918, when the tonsils were removed, the patient has remained quite well and has grown to be a fine girl, plays hockey, lacrosse, dances, and is really "wonderful."

We have not space to detail the two cases which were not so successful, one of them being in a man of twenty-nine and another in a youth of eighteen. Neither of these cases suffered from as much edema as in the two detailed. Indeed the edema was comparatively slight. The urine was more free in both of them and contained less albumin and fewer casts. There was apparently, however, a greater tendency to vascular change in these two cases. In the adult the blood-pressure was 175 and in the youth 145. It is interesting to note that, in the first case, while there was a considerable increase in the secretion of urine during the first week after operation, this practically ended the period of improvement, and in the second case there was thought to be very slow general improvement, the most marked change perhaps being a fall in blood-pressure to 120 from 145.

These cases, with others which have been reported in this country and abroad, certainly indicate that in certain conditions of the kidney decapsulation may be advantageous, and we quite agree with Horder when he says that there is a clinical type of nephritis in which when thorough general measures prove unavailing, decapsulation becomes a definite indication and promises satisfactory results. This type is subacute nephritis characterized by extensive and considerable edema, massive albuminuria with casts, toxic symptoms of the chronic uremic kind, and an absence, or the presence in only slight degree, of cardiovascular changes.

He admits that the process by which the effects of decapsulation are secured are unknown. Horder does not believe that it can be due to the formation of new vessels, because the results of decapsulation are immediate.

It is interesting in this connection to note that Sir D'Arcy Power, who operated on these cases, stated that in his opinion drainage was unnecessary, that some edema with ascites is no contraindication to operation, and that he thought both kidneys should be stripped at the same time, the capsule being cut away rather than left behind.

ACUTE DILATATION OF THE HEART.

Now and again one comes across terms in medical literature which seem to be adequate but which on analysis appear to mean very little. Many years ago before the introduction of instruments of precision, the diagnosis of "anemia" was often made in conditions of otherwise inexplicable ill health. Then "malaria" became the favorite term, and more recently unexplained illness is referred to as "influenza." In the same manner the term "acute dilatation of the heart" is often used when some accident occurs in the course of acute illness, or during, or after, a surgical operation. Levine has recently done well in calling

attention to the fact that there is little justification for the use of these terms. It may satisfy the relatives and friends, but the question arises as to whether the physician who uses these terms has really any data which justify him in the expression of such an opinion. The evidence at autopsy is not particularly convincing, and the condition is such, while life exists, that a careful physical examination and *x*-ray application are usually out of the question. It would seem probable that in many instances some disorder of cardiac action like auricular fibrillation or ventricular fibrillation is really present.

Levine reports upon nine cases occurring during or after surgical procedures in which the condition commonly called acute dilatation of the heart was observed. The value of his report consists in the fact that the condition of the heart was studied by modern methods, or in other words by the use of the electrocardiograph, instead of being guessed at. Each of the nine patients was found to have an abnormal auricular mechanism; three had paroxysmal auricular tachycardia; four had paroyxsmal auricular fibrillation; and two had paroxysmal auricular flutter. In all but two of the cases the condition was transient. In non-surgical patients Levine claims that there is satisfactory *x*-ray evidence to support the view that the heart does not dilate when the well-known symptoms usually described by this term are manifest.

He gives the additional interesting information that direct pressure on the vagus, or ocular pressure, proved successful in arresting all three cases of paroxysmal auricular tachycardia.

We are glad to see that he expresses little faith in the diagnosis of cardiac dilatation arrived at by percussion. It may be true that in chronic conditions the size of the heart can be approximately determined by careful percussion, but in acute conditions arising in patients who have not been previously studied, this method of determining the size of the heart is unreliable and often mere guesswork.

SURGICAL TREATMENT OF GASTRIC ULCER.

This subject of major import to both surgeons and physicians, affecting a larger number of people than is customarily believed, often attended by no symptoms, or at least such symptoms as would not excite the attention of the average citizen, complicated by perforation and by at times colossal hemorrhage, is discussed in the *British Medical Journal* of July 24, 1920, by Moynihan, Mayo, and others. The particular value of this discussion is incident to the fact that these surgeons have themselves operated on thousands of cases, having had associated with them skilled internists, have achieved a degree of success in treatment practically undreamed of twenty years ago, and bring to the problem not only their technical knowledge, but a ripe judgment in which the general practitioner has learned to trust.

Moynihan notes as the first step in treatment the discovery of any sources of continuing infection which may have led to the development of the ulcer. The primary infection cannot always be discovered—indeed, cannot often be localized with certainty—but it is a fair assumption to make that any chronic infection of which the evidences are still discoverable may have acted as a cause of the original ulcer, or have provoked a recurrence of it in one or more of those attacks which are a characteristic feature of the clinical history. The causal infection may not be found until the abdomen is opened, for a large number of the cases of gastric ulcer upon which the surgeon must operate are secondary to an infection arising in some part of the intestinal canal, more especially in the appendix. But there are not a few cases in which the infective agent appears to reach the stomach by way of the mouth. Diseases of the teeth or gums, of the antrum or other accessory sinuses, or of the nasopharynx, have all been found.

One of the factors most certainly causing a recurrence of ulceration in the stom-

ach, or of ulceration at or near the suture line after gastroenterostomy has been performed, is infection derived from one or other of the several sources above indicated.

A successful operation upon a patient suffering from gastric or duodenal ulceration will depend in part upon careful and adequate preparation. Not a few of the patients are weakly, ill-nourished, and of a low resisting power when first they come under care. By keeping them at rest for a few days, giving them large quantities of fluid by the mouth, or by rectum, or subcutaneously; by the administration in such fluid of sodium carbonate or glucose; or occasionally by performing a direct transfusion of blood, their condition can be greatly benefited, and the risks of operation correspondingly reduced. The practice of withholding fluids for a few hours before operation is always a procedure of very questionable value; in patients reduced in strength by lack of nourishment, or by pain extending over long periods, it is positively a factor pregnant with harm. When the operation is performed the choice of hedonal as an anesthetic in exceptional circumstances is very helpful. The anesthesia is quietly induced, lasts long, gives remarkable relaxation of the abdominal wall, and provides two or three pints of fluid at a time when fluid is much needed.

As to gastroenterostomy, Moynihan states that in about 25 to 30 per cent of the cases of carcinoma of the stomach removed by operation the claim that the malignant change is imposed upon a simple one appears on pathological grounds to be irrefutable; and every surgeon knows that in a small number—not less, certainly, than 10 per cent—of the cases of gastric ulcer, to all appearances simple in character, a microscopic examination of the specimen removed by operation reveals the early stage of carcinoma.

In consequence of his experience Moynihan has abandoned gastroeterostomy alone in the treatment of chronic ulcer because results were not as good as those following gastrectomy. The morbidity was greater, the return to health slower, the ability to take food early and generously was wanting, and more watchful after care was necessary. In patients returning for further care with the ulcer still open, a further operation was needed.

Some few cases returned with carcinoma of the stomach after so long an interval as to make it probable that the cancerous change had occurred after the operation had been performed.

There is evidence to show that gastric ulcer may develop, even after gastroenterostomy has been performed, when the stomach itself was normal.

Moynihan uses two layers of the finest chromic catgut sutures. The mortality in his hands during the last ten years is one per cent. He has had no death from the last 350 cases of duodenal ulcer. The operation of excision was introduced with great hopes, which unhappily have not been gratified. Collinson found that in 39 cases of excision there were 15 in which severe recurrence was observed. Eleven patients were submitted to a second operation, and seven of them showed active ulceration at the site of the excision. One developed a fresh ulcer distal to the original one, and three had extensive adhesions which crippled the action of the stomach.

Excision by knife or by cautery combined with gastroenterostomy Moynihan speaks of with some enthusiasm; indeed, he says that of all methods of dealing with gastric ulcer short of gastrectomy it is one of the best. He speaks of Balfour's technique, replacing the method of excision of the ulcer by that of its complete destruction by the actual cautery, as a notable advance. His experience with this method has, however, been limited, as he has become more and more radical in the treatment of gastric ulcer, and he considers the removal of part of the stomach as the operation of choice. There are ulcers of the stomach

so large, so awkwardly placed, and so deeply penetrating the liver, or the pancreas, in patients whose general condition is so poor that any operation becomes serious. Such cases may be unsuitable for Balfour's operation, by reason of the size or remoteness of the ulcer.

In performing the operation of gastroenterostomy, the intestine is cut across about 18 inches below the flexure, the distal end closed, and the side of this distal part united to the anterior wall of the stomach. As large an opening as possible is made proximal to, or in the zone of, the ulcer and extending sometimes over the fundus of the stomach. The proximal divided end of the jejunum is then anastomosed to the side of the distal limb a few inches below the gastroenterostomy opening. Into this proximal part, at a point about three inches above the junction which has just been made with the distal limb, a tube is introduced and fixed by the method of Witzel. The tube passes for several inches down through the enteroanastomosis into the jejunum. It is brought out of the abdominal wall through a small separate incision to the left of the umbilicus. It is through this tube that all nourishment is given for months, or for years, until a radiological examination shows that the ulcer is healed, or until a trial of one month, during which food is given, discloses no return of the symptoms. During this time the greatest care is taken to keep the mouth clean by friction and frequent washing. Up to the present time, in no case in which this operation has been practiced has the ulcer returned.

Moynihan holds that far greater seriousness attaches to gastric ulcer than duodenal ulcer. Operations upon it are more serious, partly by reason of the extent of the operations themselves, chiefly in consequence of the less robust state of the patients. Recoveries after operation are fewer whatever the nature of the operation, and the rate of mortality of the patients in the years subsequent to operation, as Balfour has recently shown in a paper of great value and of new significance, is, in the cases attended in the Mayo clinic, three times as high as in patients operated upon for duodenal ulcer. This on reflection is not so startling a fact as may at first appear; for many of the patients suffering from duodenal ulcer are men otherwise of robust strength and splendid health.

A duodenal ulcer is often a simple round "terraced" ulcer affecting the intestine alone; a gastric ulcer is very prone to extend and to burrow deeply into other parts —the pancreas, the liver, the abdominal wall; and the later history of the two diseases is very different.

Moynihan has always done partial gastrectomy whenever it can be safely performed. The risk is not great: over a period of ten years it is not more than 2.5 per cent. All things considered, and account being taken of the five years succeeding operation, it is probably a safer operation and is certainly a more immediately satisfactory one than gastroenterostomy alone. It cannot always be practiced. The condition of the patient may forbid it. The ulcer may be so large and so placed as to make removal a matter of so great technical difficulty that the immediate hazards are unfair to the patient. But as experience grows the number of such cases diminishes.

The duodenum is divided just beyond the pylorus, after ligature of the pyloric and gastroduodenal arteries. An opening is made in the transverse mesocolon, in the arch of the anastomosis of Riolan, in order to guide the surgeon in his ligature of the omentum below the greater curvature, so that the middle colic artery may be avoided, and in order that the conditions at the back of the stomach may be early and fully investigated. After division of the great omentum as far toward the left as the point at which the stomach is to be divided, the whole organ is turned over the left edge of the parietal wound, until the coronary artery is brought into view and ligatured

with great ease at exactly the place required. As soon as this vessel is cut an anchor is let go, and the stomach is moved more freely. Then while the stomach is held as a retractor an anastomosis is made between it and the jejunum.

Moynihan always applies the end of the stomach to the side of the jejunum. To prevent bilious vomiting he usually divides the jejunum completely across, about eight to ten inches below the duodenojejunal flexure, closes the distal end, and makes an anastomosis in "Y." The patients do not have a protracted convalescence, nor has a single case shown recurrence.

Moynihan records 805 operations with 12 deaths, a mortality of 1.23 per cent.

Mayo notes that gastric ulcer is a comparatively rare disease, representing but a fraction of 1 per cent of the findings at general autopsies. The proportion of gastric to duodenal ulcers is approximately 1 to 4. In the Mayo Clinic reports both gastric and duodenal ulcers were found in the same patient. Mayo believes that in the chemistry of the bacterial products lies the explanation of the chronicity of the disease.

Ulcer is undoubtedly developed by a combination of local chemical effects, or by direct interference with the circulation through infarction emboli of bacteria. Mayo states that in 1191 cases of gastric ulcer the mortality was three times as great as that in duodenal ulcer. A stomach which has developed qualitative food dyspepsia rarely has an ulcer, but represents a gastric reflex appearing within the half-hour, while quantitative food dyspepsia is usually associated with interference of peristalsis, which, if intestinal, appears at the end of the first hour.

In true ulcer hemorrhage is a symptom in approximately 20 per cent of the cases. No attention is paid to occult blood. The *x*-ray diagnosis has been made in 95 per cent of cases. Mayo believes that the control of the acid limits peptic activity and gives relief of symptoms. Nevertheless treatment but tides the patient through the exacerbation and does not cure permanently. Of 638 patients with calloused ulcer of the stomach, the average mortality was 3.2 per cent, more than double the average mortality of nearly three thousand patients suffering from duodenal ulcer. Most of the ulcers were in the lesser curvature.

Hunter, actuary of the New York Life Insurance Company, in an investigation at the clinic of the results of operation in a large series of cases of gastric and duodenal ulcers, found that the average death-rate for the four-year period after operation in patients with gastric ulcers was slightly more than three times the normal, while in the duodenal ulcers it was slightly less than normal. The series consisted of 2431 patients, and all but 108 were traced.

If it is true that the majority of the cases of duodenal and gastric ulcer have an average duration of a number of years, many extending from twenty to thirty years, it is probable that there is an exaggerated idea of the danger to life. Few persons die from perforation, and few from hemorrhage—more, however, than die from surgical procedures. It is true that they suffer, are disabled, and should be relieved; and it is also probable that but a small percentage of the total number of ulcers are recognized or treated for the true condition. Gastric ulcers may give greater discomfort than duodenal ulcers, and because of the danger of malignant degeneration should be destroyed at the time of the operation unless this procedure would add unwarranted immediate risk.

In the discussion, to which the other contributors do not greatly add, Moynihan calls attention to the fact that hyperchlorhydria is not the rule in cases of gastric ulcer. In his own cases it has been present in less than 30 per cent. Smithies has shown that in 2168 cases of proved gastric ulcer (which is quite a different

thing from "gastric ulcer") the free HCl values were absent or below normal in 33.4 per cent. Therefore the "physiological" value of the operation can only be necessary in one-third of the cases; and in none of the cases is there yet any proof that an ulcer of the stomach heals better in an alkaline than in an acid medium. But if a physiological result is needed, gastroenterostomy is not the best method of producing it; it would be better to join the gall-bladder to the stomach.

SOME LABORATORY CONTRIBUTIONS TO SURGERY.

In the November number of *The Military Surgeon* there appears an article setting forth the war work of the Rockefeller Institute, describing the laboratory and practical schools there established for the education of the medical officer, and naming the valuable contributions made by this institution and the efforts toward installing a better appreciation of the fundamental principles on which good surgery is based and a better application of these principles to the relief of those suffering from infections.

In this school animals were employed to demonstrate that regarding the treatment of tetanus there are three points of cardinal importance: (1) The removal of the primary cause by proper surgical methods; (2) the neutralization of the free toxin in the blood and the lymph by means of a thorough serum treatment; (3) the treatment of the tetanic manifestations after the toxin is once fixed in the nerve cells and thus is unamenable to the neutralizing action of the antiserum. Here chiefly the treatment by magnesium is indicated.

The action of magnesium was demonstrated by actual experiments on tetanic dogs: (1) Animals in a severe and dangerous state of tetanus were relieved and restored to nearly normal within a few minutes by a judicious intravenous injection of magnesium sulphate; (2) in another experiment it was shown that an injudicious administration of the magnesium salt may endanger the animal's life; (3) it was finally shown that tetanic animals which received intentionally too much magnesium and thus were in imminent danger could be saved in a few minutes by an intravenous injection of a normal solution of calcium chloride. There were animals in which after receiving a very large dose of magnesium the respiration was completely abolished and the heart's action could not be felt any more; they were nevertheless resuscitated by means of calcium; and with pharyngeal insufflation.

Concerning the chlorine compounds it was shown that Dakin's hypochlorite solution and chloramine-T solution quickly destroyed the exotoxin (Bull) of B. welchii, the toxins of diphtheria and tetanus bacilli, and the venoms of crotalus and naja species of serpents.

Other chlorine compounds showed no appreciable solvent action on blood clot, and hence arises the advisability of a proper mechanical cleansing in order to prevent blood clot which may harbor bacteria.

It will be remembered that after the Institute had demonstrated the value of serums in the treatment of epidemic meningitis and pneumonia their manufacture was taken over by commercial firms. These, however, produced a product so unreliable that at the request of the British authorities the Rockefeller Institute again resumed their preparation. During this period it supplied serum without cost to the army and navy, and to the civilian population of England, and smaller quantities to France, Belgium, and Italy.

For the most part the antimeningococcic serum produced was polyvalent, and in its preparation a considerable number of strains (as many as 51) of meningococcus were employed for inoculation. Representative strains fresh from the human host were introduced continually in order to

maintain wide potency in the serum. These strains included representatives of the normal and parameningococcic, differing but slightly in their agglutinative qualities; and then representatives of the intermediate strains between the two main types, in which the agglutinative differences were more marked. Toward the end of the war period this number of strains was materially reduced, and simplifications of this and other kinds were introduced into the manufacture of the serum which considerably diminish the cost and labor incident to the process.

The antipneumococcic sera types I, II, and III were produced in considerable quantity for diagnostic so-called "typing" purposes. According to this process, cases of pneumonia due to pneumococcus are differentiated according as they are incited by pneumococcus type I, II, or III, or one of the more miscellaneous pneumococci assembled under the designation type IV. No therapeutically satisfactory serum has been produced for the so-called types II, III, and IV pneumonia. Hence it is essentially unscientific to treat cases of lobar pneumonia with so-called polyvalent serum. The clinical evidence, on the other hand, supports the value of an effective type I serum.

The titration of the type I serum is made by protection tests on mice. White mice are given intraperitoneally varying doses of pneumococci, and at the same time a fixed quantity of immune serum. Animals surviving for five days are considered as being effectively protected. All animals, except the virulent controls, receive 0.2 Cc. of immune serum intraperitoneally. Serum of type I in quantities of 0.2 Cc. uniformly protects against 0.1 Cc. of a broth culture of the homologous organism, which kills regularly in doses of 0.000001 Cc. This measure of the protective power of type I antipneumococcus serum has been adopted as the standard of potency for therapeutic use.

The therapeutic type I serum is prepared in the horse by injecting the animal intravenously with gradually increasing doses of killed, and finally highly virulent, cultures of pneumococcus type I. An immune serum produced in this manner is found to possess a specific action against all organisms of type I. This serum is also applicable for typing pneumococcus I. The diagnostic or typing sera II and III are also prepared in the horse in the same manner.

In order to apply serum treatment in any individual case, it is essential to have a method of determining very promptly after the patient comes under observation the type of organism concerned. This may be done by injecting into the abdominal cavity of a mouse a portion of sputum coughed up from the lung of the patient. After sufficient growth has occurred, usually in from six to eight hours, the mouse is killed, the abdominal cavity washed out, and the blood cells and fibrin thrown out by slow centrifugation. In this manner a suspension of organisms is obtained, and the agglutination test can be carried out immediately. If mice are not available, a rapid culture method has been devised whereby growth of the organism from sputum is greatly facilitated by the use of a special medium. In addition to the special technique developed for the determination of types of pneumococcus in sputum, cultures of the organisms from the blood, from spinal fluids, or exudate of empyema, may be typed by the use of the agglutination reaction, or the precipitin test.

Demands for antidysenteric serum first came from France. For therapeutic purposes a polyvalent serum was produced by inoculating cultures of B. dysenteriæ, Shiga, Flexner, Y, and Strong. The rapid method of immunization was employed also in the production of this serum.

The polyvalent antidysenteric serum was used also for the identification of dysentery bacilli by the agglutination test, for which

it was supplied to camp and private laboratories.

During the period of production of the antidysenteric serum, an experimental study was conducted on the nature of the toxin of the Shiga bacillus. This toxin, as present in cultures or extracted from the bacilli, was determined by Olitsky and Kligler not to be a simple substance, but to be composed of two poisons. These two poisons could be separated experimentally and were found to consist of the exotoxin, which has an affinity chiefly for the nervous system and is neutralizable in multiple proportion by its corresponding antitoxin, and the endotoxin whose affinity is for the enteric system, and cannot be neutralized by its antiserum in multiple proportion.

Gaseous gangrene became a very serious form of war-wound infection. Until late in the war period, gaseous gangrene was viewed chiefly as an infection with B. welchii; later the important fact emerged that a number of anaerobic bacilli of the soil were responsible for and often cooperated in producing this condition. On account of this consideration, the wide applicability which it was hoped that the anti-B. welchii serum would have, both as a preventive of and treatment for gaseous gangrene, was not realized. Nevertheless, the fundamental studies of Bull on the exotoxin of B. welchii remain a milestone in the unraveling of the pathology of gaseous gangrene and contributed essentially to the perfection, toward the end of the war, of a polyvalent prophylactic and curative serum, covering the anaerobic, gangrene-producing bacilli responsible for the several varieties of gaseous gangrene of infected war wounds.

Horses have been immunized with the toxin and made to yield antitoxin of high neutralization value or titre. With this antitoxin a number of cases of gas gangrene, arising in industrial accidents, etc., have been treated successfully. Considerable quantities of the serum were sent to France. Its employment was more or less disappointing, for the reason stated above, namely, that gas gangrene is rarely a monoinfection with B. welchii, but usually a polyinfection with several distinct anaerobic bacilli. The other important anaerobes found in infected wounds are: Vibrion septique, B. sporogenes, œdematiens, bellonensis, histolyticus, tetani, putrificus, fallax. A number of other unidentified anaerobes have also been isolated. The mere control, therefore, of intoxication by B. welchii, and even the suppression in the wound of that bacillus, is inadequate. However, in producing a polyvalent anti-gas gangrene serum, the method of securing the toxin discovered by Bull is employed with the the other anaerobes for which a polyvalent antitoxic serum giving promising clinical results has been produced.

The sources of infection in such diseases as epidemic meningitis and lobar pneumonia may be regarded, for all practical purposes, to be personal, and the mode of infection always to be via the respiratory mucous membranes. In these two diseases, the inciting microörganisms — meningococcus and pneumococcus—are contained within the secretions of the nasopharynx of cases of epidemic meningitis and lobar pneumonia, of chronic carriers who have passed through attacks of those diseases, and of healthy carriers of the respective microörganisms.

Under circumstances of camp organization, protection has been sought first through early hospitalization of cases, next according to the disease (meningitis) by the detection and abstraction of carriers, and third by the inoculation of killed cultures of the several inciting bacteria in an effort to prevent infection through a process of active immunization.

The observation has repeatedly been made that chronic carriers of the meningococcus themselves rarely become ill with meningitis. Hence another factor besides the presence of the meningococcus in large

numbers in the nasopharynx, and over long periods of time, is required in order that infection of the meninges may occur.

The study on the effects of vaccination with the meningococcus was carried out at Camp Funston by Lieutenant Gates. The essential point of this study is that inoculation with killed meningococci is easily practicable and is followed promptly by the appearance of antibodies for that microorganism in the blood; and similar antibodies are detectable in the blood of chronic healthy carriers of the meningococcus who have long been able to escape infection of the meninges.

That the incidence of lobar pneumonia may be reduced by protective inoculations of killed type cultures of the pneumococcus was shown clearly by Lister in South Africa. As pneumonia claims so high a percentage of the deaths from disease in camp life, an effort to reduce the morbidity incidence by vaccination was undertaken.

The inoculations were carried out at Camp Upton on 12,519 men. Prophylactic vaccination against pneumococcus of types I, II, and III is practical and apparently gives protection against pneumonia produced by these types. It remains to be determined how long this immunity persists.

Under circumstances of wide prevalence of bacillary dysentery, it would appear that analogy with the mode of infection in typhoid fever should subject this condition to control by means of prophylactic vaccination. Hence a study was begun of the possible value of an oily suspension of the killed dysenteric bacilli for this purpose.

The oil acts as a passive agent in merely suspending the bacteria without altering their properties. The slow absorption of the suspended bacteria from this vehicle mitigates the toxic effects of the dysentery bacilli. At the same time it does not interfere with the immunity response — antibacterial and antitoxic.

As a result of the slow absorption of the dysentery bacilli from the oily suspension, only slight local and general reactions follow, and it is possible to give at one time and in a single dose a sufficient number of the killed dysentery bacilli to incite a high degree of immunity.

The experiments on animals and a small number of tests on man indicate that the single injection of an almond oil suspension of the Shiga and Flexner groups of dysentery bacilli suffices to afford protection, as indicated by the appearance in the blood of definite specific antibodies for each group of the bacilli, and by the protection of animals from otherwise lethal doses of the living organisms or their toxic products. The extent to which vaccination should be applied to man will depend on circumstances and conditions still to be defined, but the method appears to be wholly practicable.

The question of the disposition of the chronic meningococcus carrier, in military life, is a very difficult one when the carrier state persists, as it sometimes does, for many months.

Of twenty-three carriers 20 cleared up and were discharged free of meningococci of the nasopharynx, this after the removal of adenoids, tonsillectomy, and the draining of sinuses and exposure to a vapor of chloramine-T for a period of 40 minutes three times a day.

Progress in Therapeutics

Medical Therapeutics

Acute Methyl Alcohol Poisoning.

Isaacs, in the *Journal of the American Medical Association* of September 11, 1920, states that various treatments have been recommended. These consist of stimulants, as caffeine, adrenalin, strychnine, digitalis, camphor, oxygen, pilocarpine, and also potassium iodide. Gettler and St. George suggested saline or sodium bicarbonate infusions and phlebotomy, with repeated gastric and rectal lavage. Fenton reports a case of blindness in which the patient recovered after the instillation of ethylmorphine hydrochloride (dionin) into the eyes. The patient was also taking sodium bicarbonate freely by mouth. Harrop and Benedict report the recovery of a patient following 5-per-cent solution of sodium bicarbonate intravenously.

The plan of treatment is based on alkalinization and elimination. If the patient is not comatose, and is received within twelve hours after taking the wood alcohol, it is well to pass a stomach tube and wash out the contents with a 1- or 2-per-cent solution of sodium bicarbonate in warm water, as experience has shown that some of the alcohol is excreted into the stomach. Three or four ounces of a 50-per-cent solution of magnesium sulphate are then carefully poured in through the tube and left in the stomach. Sometimes an hour or more after washing the patient will vomit a considerable amount of food débris having a marked odor of methyl alcohol. The patient is put to bed, kept warm if his temperature is low, and is given 3 gm. (45 grains) of sodium bicarbonate, with about 250 Cc. of water every two hours, for about six doses, being awakened for his medication if asleep. Sometimes a whiff or two of aromatic spirits of ammonia will serve to awaken the patient enough to make him swallow. The dose of bicarbonate may be doubled without apparent ill effects. After this the patient is given 3 gm. (45 grains) of sodium bicarbonate with a glass of water, three times a day, one hour before meals, until the symptoms have disappeared. A safe guide as to the dose is to keep the fresh urine alkaline to methyl red. Fluids are forced, and a liquid diet is given until the acute symptoms are over. Then the diet may be as varied as the patient wishes.

If the patient is comatose, or if the cyanosis is very marked, with respiration much depressed, it is well not to wash out the stomach at first. In this case, or if medication by mouth is not retained, 1000 Cc. of Fischer's sodium carbonate (0.37 per cent) or sodium chloride (1.4 per cent) solution at 99° F. is given slowly intravenously. In case of any doubt, it has been his custom to give the intravenous injection. No ill effects have been noted. If there is time and there seems to be congestion of the venous circulation from embarrassment of the right side of the heart, it may be well to draw off from 100 to 300 Cc. of blood before giving the intravenous injection. Half may be given at one time, and the other half later. It has usually not been necessary to give a second intravenous injection on succeeding days. A spinal puncture may be made if there is much restlessness and if there are signs of cerebral compession. After Fischer's solution there appears to be a dehydration of the nervous tissue, with increase in spinal fluid. The breathing usually improves rapidly, the mental state clears, and in from six to twelve hours the cyanosis has virtually disappeared. There is rapid improvement in the eye signs, the blurring of vision disappearing in from twelve to twenty-four hours, or sometimes a slightly longer period. The abdominal tenderness soon disappears.

It is well for the patient to remain in bed until the cyanosis has disappeared and

the mental confusion has cleared. The bowels should be kept open with magnesium sulphate. The average stay in the hospital was about five days, with treatment for two or three days. It is well to have the patient return at intervals to note whether or not there has been any permanent damage. All his patients have had homatropine or atropine sulphate dropped into their eyes for ophthalmoscopic examination.

The toxic symptoms are produced by widely different amounts in different individuals. The blurring of vision varied from inability to count fingers held about a foot in front of the eyes to inability to read ordinary newspaper print, but with enough light perception to count fingers. These conditions had cleared up entirely at the time of discharge.

Issacs concludes as follows:

1. Wood alcohol appears to vary in its toxicity to different individuals.

2. The symptoms are those of depression of the medulla and the cranial autonomic system, and at times the sacral. There is usually a marked and early effect on vision.

3. There is a rapid disappearance of the symptoms (unless the anatomic injury is beyond repair) with intensive alkali therapy.

4. Many of the toxic symptoms probably accompany the acidosis, which may be associated with the acid production (formic) and with methemoglobinemia.

Mercurochrome-220: Its Use in Ophthalmology.

LANCASTER, BURNETT and GAUS, in the *Journal of the American Medical Association* for September, 1920, state that in acute infections of the conjunctiva a 1-per-cent or 2-per-cent solution of mercurochrome-220 was instilled, from one to several drops at a time, from three to ten times a day. The secretion of mucus and pus was very rapidly diminished, often strikingly so. The same is true of many other drugs, however. It is their opinion that a more rapid reduction of discharge takes place under mercurochrome-220 than under zinc sulphate, boric acid, argyrol, or mercuric chloride, which are the drugs they most frequently employ.

It is particularly gratifying to see a conjunctivitis following an operation on the eyeball respond to mercurochrome-220. If on removing a dressing they find a notable amount of discharge, they use mercurochrome-220, 1 per cent, three times a day, and expect to find a marked improvement the following morning. The combined effect of the trauma of the operation and the bandage often sets up an increased discharge from the conjunctival sac; and this is more promptly and surely arrested by mercurochrome than by any other treatment they have tried.

In plastic operations in which skin grafts are used, it is not uncommon for an offensive odor to appear after a few days, showing the growth of saprophytic organisms; 1-per-cent mercurochrome-220 in small doses applied twice or three times a day will promptly stop the odor, not by its deodorizing but by its antiseptic action.

In ulcers the drug shows by its staining quality that it penetrates the infiltrated zone.

Cardiovascular Response to Injections of Adrenalin.

The *British Medical Journal* of September 25, 1920, in commenting editorially on this subject, says hypodermic injections of adrenalin are so frequently employed as an efficient remedy in asthma, and are now becoming—at any rate in America—such a routine diagnostic procedure in the detection of thyroid intoxication, that information about the reactions thus induced is interesting. Individuals vary much in the cardiovascular response to these subcutaneous injections, and very unpleasant symptoms, such as palpitation, throbbing in the head, tremors, shivering, nervousness, distress, and precordial pain of an anginoid character, may follow; the physical signs include a rise in systolic pressure, increase of the pulse pressure, or the difference be-

tween the systolic and diastolic pressures, rapid pulse, mydriasis, and glycosuria. As is well known, Eppinger and Hess, who introduced the conception of vagotonia and sympatheticotonia, considered that persons with an excess of adrenalin and increased tonicity of the sympathetic (as distinguished from the autonomic or parasympathetic) system were characterized by a well-marked response to adrenalin.

This explanation has met with more criticism than confirmation, and Clough, in "a study of the cardiovascular reaction to adrenalin and adrenalin sensitiveness in patients with hypertension," will have none of it. He gave hypodermic injections of 1 Cc. of Parke, Davis & Company's 1-in-1000 adrenalin solution to 95 persons, 32 of whom were regarded as normal subjects, and on the basis of the cardiovascular response, as judged by the degree of rise in the systolic blood-pressure, of the increase in the pulse pressure, and the acceleration of the pulse, divide them into four groups —namely, those with a negative or insignificant reaction, a moderate, a well-marked, and a very well-marked reaction. Of the two factors—direct stimulation of the heart and vasoconstriction—the first plays the chief part in moderate reactions, whereas in severe reactions the second is also of importance. Out of the 32 normal persons 82 per cent gave an insignificant or moderate reaction. The most striking point among these observations was the frequency of a well-marked reaction in patients with a high blood-pressure, which was taken as 155 mm. Hg or more; out of 22 such patients 15, or 68 per cent, were found to show marked reactions to adrenalin, whereas such reactions were obtained in only 26 per cent of the other 68 cases, and in 18 per cent of the 32 normal subjects. In none of these 15 cases were there any noteworthy sympatheticotonic symptoms as formulated by Eppinger and Hess.

In his critical discussion of the significance of this sensitiveness to adrenalin on the part of persons with a high blood-pressure, Clough, controverting the usual opinion, concludes that it is now well established that adrenalin is not a direct means of maintaining the blood-pressure at the normal level, and, further, that in spite of a number of positive results which are shown to be open to fallacy, there is not any satisfactory direct proof of an increased amount of adrenalin in the blood in human disease, or that high blood-pressure is due to or associated with adrenal overactivity or "hyperadrenalinemia."

In the great majority of patients with high blood-pressure there is no evidence of any thyroid disturbance, and it is therefore doubtful if there is any direct relation between the two conditions. The sensitiveness to adrenalin of patients with a high blood-pressure is very probably only one of the manifestations of a general abnormal reactivity of the cardiovascular system, such patients often showing an unusually well-marked blood-pressure response to exercise, emotion, or excitement. These are, of course, the conditions in which Professor Cannon and others believe that an increased secretion of adrenalin occurs, but, as mentioned above, Clough does not accept this conclusion, and he considers that this sensitiveness may be due to an abnormal state of the sympathetic or the nerve endings without its being necessary to assume overactivity of either the chromaffin system or of the thyroid.

Puerperal Sepsis and its Treatment.

TITUS, in the *Boston Medical and Surgical Journal* of September 23, 1920, points out that in puerperal sepsis nature attempts to localize the inflammatory area by a leucocytic wall, and pathology teaches that when the curette, no matter how gently used, goes into the infected uterus it breaks down this leucocytic wall in its attempt to remove the infection and lays open new areas for further infection. Consequently the curette defeats its own purpose. It makes a bad matter very much worse.

Referring to the rationale of antiseptic douches he reminds us that many sorts have been used from time to time: corrosive in the strength of 1:3000; alcohol, 70 per cent;

lysol, etc. Bacteriologists teach us that a solution of one to three thousand corrosive takes many minutes to kill the ordinary pyogenic organism when it is lying in the solution. The same is true of alcohol. When a douche is used, the return flow will make up almost the entire amount that has been used; not more than an ounce or so will remain in the uterus, and when this solution mixes with blood coagulation occurs, searing off the uterine cavity. If this is so, how many organisms that are doing harm in the uterine mucosa are attacked by this solution sufficiently to destroy them? Douches given for the purpose of washing detritus from the uterine cavity are rational; douches to combat organisms in the uterine mucosa cannot expect to attain the result desired. So frequently, following intrauterine douches, a severe constitutional reaction is seen that it seems hardly wise to resort to these douches unless something definite for the patient's good is to be obtained.

If nature successfully combats the infection and localizes it in the uterine wall, the patient will get well with no other surgical treatment. Fresh air, as in the severe hemolytic invasions, is the most important single detail; plenty of good food, catharsis, alcohol baths, and general hygiene, just as any one would treat any medical disease, until the formation of pus has taken place, which always requires drainage. These patients, too, are sat up in bed, ice is applied to the fundus, ergot given empirically; and nothing else should be done.

If the disease remains localized in the uterus and it is not spread by uterine injury, it will run its course from a few days to several weeks, depending upon the virulence of the invading organisms and the patient's resistance. One should watch during the convalescence of such a patient for signs of parametric infection. They show by a rise in temperature after it has been somewhat lower, and pain and tenderness by palpation over the affected parametrium. It is fortunately true in puerperal infection of the pelvis that nature surrounds the affected site with layer upon layer of exudate, attempting to localize such infections in the pelvis. The result is, as is not true in appendicitis, that the invasion of the general abdominal cavity is unusual. The treatment of the infection that has gone outside the uterus, showing its localization on one side or the other, is ice over the site, careful watching of the patient, and vaginal examination from time to time to watch for the gravitation of pus into the fossa of Douglass. When this occurs vaginal puncture will relieve the abscess. Going into the abscess from above is almost never indicated, and usually is quite hazardous. Infections that go outside the uterus may follow the round ligament to the abdominal wall, where localized abscesses may point, and when they do surgery is indicated to evacuate them. The lymphatic chains that follow the ureters to the kidneys are oftentimes invaded, so that perinephritic abscesses following puerperal sepsis are not uncommon and indicate drainage, as does pus anywhere else in the body. The blood-stream becomes infected, and general septicemia results, if nature's leucocytic wall has not been sufficient to localize the condition. The patient must be treated for general sepsis, and whether she recovers or not depends much upon her resistance. Those cases which live months with sepsis are often of the pyemic variety; each abscess as it develops indicates surgery, but until an abscess is definitely diagnosed surgery is of no avail. These septic cases are medical, as is pneumonia until it develops as empyema, until they develop pus. Surgery in the puerperium means the evacuation of pus; it holds almost no other function.

The staphylococci characteristically are more gradual in their onset than streptococci, the temperature taking several days to reach its height before maintaining its level. It is often of the step-ladder character. The pulse ranges from 110 to 120. The uterus in these cases on the third or fourth day is not hard, it is not small; it is tender, and the lochia contains pus. Intrauterine treatment, either the douche or the curette, is no more rational here

than in the previous type. Nature's walling-off process is less destructive and far safer. The empirical treatment—fresh air, elevation of the head of the patient, hygiene, ice, and ergot—will maintain the patient's resistance, favor localization processes in the pelvis, aid drainage, and do, what is most important, no harm.

This condition may last a few days with a subsequent drop to normal of the temperature, providing, of course, that nature has been successful in her attempt to prevent further infection.

On the other hand, infection into the blood-stream by continuity into the surrounding tissues, by the lymphatics to the kidneys, may occur. These extensions are to be treated symptomatically just as the invasion of bacteria in any other part of the body is to be treated, until localized pus develops, and this often never will occur.

No one thinks nowadays, when a streptococcus throat has resulted in a septicemia, to remove the tonsils. To be sure the tonsil is the source of the infection, but when the streptococcus is in the blood, treatment directed to the tonsil is of no avail, and so with the uterus. If there were any means of dealing intelligently with early uterine sepsis locally before extension could occur, it would be the only rational treatment, but pathology teaches us that nature's defense is far more adequate than any intrauterine manipulation that we know of to-day.

Spinal Anesthesia in Obstetrics.

Writing in the *Southern California Practitioner* for September, 1920, COOKE states that following spinal injection there is no pain, because the dilating tissues causing the pain have been desensitized by it.

The patient is conscious because no general anesthetic has been given, the woman can talk and coöperate and follow directions.

Consciousness. — When one gives the mother a general anesthetic, both the mother and the baby are unconscious, and instruments have to be used, and the baby resuscitated. When "twilight sleep" is used, it also affects the baby through the mother's circulation, and frequently the child is born without respiration or is asphyxiated from the morphine, and it has to be resuscitated or is dead. The method is long drawn out, dangerous, and needs constant supervision. Nitrous oxide, as is well known, is a poor relaxing agent, consequently an unsatisfactory dilator; it relieves the sharper pains, but in larger doses is a general anesthetic; it is pleasant to take, is spectacular for the patient, but ether frequently has to be added at the last for relaxation and the forceps used. Then there is the old obstetrical standby chloroform, the less used the better, also a circulatory anesthetic affecting the baby; and finally ether, with its mucus, also a circulatory anesthetic. After all Cæsarian sections under ether the baby has to be resuscitated. All four of these methods leave much to be desired, all affecting the circulation. They are not of much, if any, value for either the doctor, nurse, or patient. If given to the extent of obliterating all pain, they cause unconsciousness, anesthetize the child, and cause additional care for the doctor and nurse. There is frequently vomiting and disturbed nutrition and distress for the patient to the extent that they all say, "Never again for me," and this may make an abortionist out of the woman.

In contrast to these conditions, what can we expect from the painless conscious method?

The patient is not nauseated, does not vomit.

There is no interference with nutrition. Patient can have cracked ice, or can eat or drink moderately, if she wishes, and thus be refreshed.

Even the injection causes very slight pain, if dexterously given, not as much as does the average hypodermic injection into the arm.

If the patient has had some severe pains before injection there is immediate relief after the injection, usually in a half minute. Then there is usually a resting stage of twenty minutes, maybe a little longer, and

possibly no perceptible uterine contractions, but completion of the dilatation of the cervix and relaxation of the pelvic floor are progressing as the child is settling down into the birth canal. Then gradually uterine contractions return and increase in intensity, as the woman does not now inhibit them, for the pain reflex has been obliterated, and the child is soon born crying. The birth is not precipitate; it simulates a normal birth, but without the pain and discomfort. Cooke's first case, before he withdrew the needle from between the vertebræ, said, "Why, doctor, my pain is gone. Oh, such a relief!" This case, while not a representative case for the method, was delivered with low forceps, a slight tear and a repair, totaling thirty-five minutes, all without pain. He believes that if she had been left a half-hour longer she would have delivered herself without pain after the injection, but he was not sure of that at the time, and the obstetrician was anxious to get away to another case, with the above result, which was highly satisfactory to all concerned, and especially to him, as it confirmed his ideas in several ways.

The relaxation is complete, and there are no tears due to pain contraction reducing the size of the outlet.

Tears, if any, are due to the abnormality in size of the parts and would be inevitable with any method, but can be repaired at once without pain.

If operative procedures are necessary, such as sutures, breech extraction, or version, there is full dilatation and relaxation and no pain sense.

The baby is not affected at all, and cries at once (a great relief to the doctor), is not cyanotic, and does not have to be resuscitated.

This is not a circulatory anesthetic, but a nerve inhibitor; there is no nerve connection between the mother's sensory nerves and any of the nerves of the child.

There are less detrimental effects to the kidneys by this method than any other; in eclampsia cases spinal anesthesia lowers blood-pressure, and while the needle is in the spinal canal one can relieve the pressure of the spinal fluid by removing 20 or 30 Cc. of fluid and reducing the pressure. The anesthetic acts in less than a minute, aids in dilatation of the cervix, and allows one to empty the uterus quicker than by any other known method, which may save many precious minutes at this time and may save two lives. He especially recommends this feature in eclampsia cases.

If one has obstetrical cases complicated with heart, lung or kidney pathology, such as influenza or pneumonia, spinal analgesia is the choice of anesthetics, because inspiration anesthesia, such as ether or chloroform, is out of the question, and even nitrous oxide could not be used; and as anesthesia cannot be obtained with oxygen alone, one can conceive how important this method is in these cases.

Cooke has had two cases of primiparas that delivered in two hours from the time of injection, by their own powers, without morphine or atropine to aid the anesthetic, or any pituitrin to aid the fundus in contracting.

It is his opinion that pituitrin can be given and that it will act synergistically, but as the spinal injection gets the relaxation and removes the opposition a less number of contractions are necessary; there is less uterine inertia, and less need for pituitrin. This is how it shortens the second stage.

The mother is not so worn out and returns to her bed in excellent condition, with no after-effects except return of sensation.

The time of the second stage can, in some instances, be reduced three-fourths.

The more pathological the case the more satisfactorily will spinal injection show up by comparison.

There is the least amount of absorption of a poison in the system than by any other method of anesthesia it can be compared with, consequently the after-effects are *nil.*

Cooke believes that as soon as this method becomes known by women generally, and they understand the relief that they can obtain from it, they will be clamoring for it and we will have to use it to satisfy them.

The Uselessness of Antimony in the Treatment of Filariasis.

Low and Gregg, in the *Lancet* of September 11, 1920, refer to a report made by Leonard Rogers upon antimony injections given intravenously for the treatment of filariasis, he having pointed out that very careful and prolonged counts are necessary before coming to a conclusion as to the efficacy of this treatment. Rogers's results, on the whole, appear to indicate that these injections have a definite effect in greatly reducing the filarial embryos or causing them to disappear from the peripheral blood, presumably as a result of the destruction of the adult worms.

In a case of their own tartar emetic injections were given intravenously in the usual manner, commencing with ½ grain and increasing by ½ grain each time till 2½ grains were reached, a total of 17½ grains in all being given. The patient bore these very well without ill effects, but the injections had no effect upon the infection at all, the adult worms not being killed and continuing to pour embryos into the blood as before. The embryos were not all killed, as, even though reduced in numbers, as on the night after the injections, those present were alive and healthy.

The only feature worthy of note is that at first there were fewer embryos in the sample of blood taken on the night of the injections, which were given at 4 P. M. This is not surprising when one considers that they would be in the lungs at that time and that the antimony would come in direct contact with them in a concentrated solution. That there was no effect upon the adults is shown by the numbers being up to normal the next evening and afterward. Further, toward the end of the injections, even although the large dose of 2½ grains was being given, this temporary disappearance was no longer noticeable, the number found on the same evening as the injections being up to the average, or even a little above. If the female worms constantly pour young into the blood, then there must be a corresponding destruction going on to keep the numbers at this mean rate. Possibly on the days when over 20 embryos per slide were found there may have been an increased outpouring from the female; or, of course, there may have been several females present giving birth to embryos intermittently.

It would appear, therefore, that antimony is not to prove a specific for filariasis as it is for bilharzial infections, but the only way finally to decide this point is to follow up cases, as Low and Gregg have done, all results being checked by careful enumerations of the embryos.

The Origin and Prevention of Interperitoneal Adhesions.

Behan, in the *American Journal of the Medical Sciences* for September, 1920, states that he has used lanolin and boric acid (5 per cent) in over three hundred abdominal sections and has noted no bad results from its use. In fact, patients after its use claim they have very little pain, and those who have had a previous abdominal section and are able to compare their sensations with those experienced after the previous operation are always pleased with the greatly lessened pain which they experienced when lanolin and boric acid had been used. For this reason, *i.e.*, the relief of pain alone, the use of lanolin and boric acid is justified. It certainly produces greater ease in the very severe operative patients. He finds it very beneficial in those patients who have developed adhesions around the cecum and ascending colon, either from a chronic appendicitis or as the result of some congenital defect by which stasis is present in the colon, and has resulted in a perityphlitis and pericolonic adhesive formation. In such patients he uses it very liberally and has had uniformly good results. He has also used it in several cases of recurring interperitoneal adhesions with gratifying absence of the former symptoms.

The presence of adhesions between the omentum and adjacent viscera or the omentum and the abdominal wall, where a previous operation has been done, is also a

suitable indication for the use of lanolin and boric acid.

In using lanolin and boric acid, however, precaution must be taken that the lanolin secured is as nearly pure as possible. Most of the lanolin on the market is contaminated in various ways, and frequently its interperitoneal use causes a very marked reaction—*i.e.*, an elevation of temperature and of pulse. It should also be sterilized three times on three different days, each time for a half-hour at a temperature of over 212°. Before being used it should be heated so that it is absolutely fluid; in fact, it should be applied very hot to the peritoneal surface. In this way it dries out the moisture of the peritoneum and at the same time sticks very firmly to it. It should not be applied upon a moist surface. The bowel should be dry before its application.

Behan has also used lanolin and boric acid rather successfully in tendon implantation and transference, also in cases in which it was necessary to liberate tendons from adjacent structures, the adhesions being due either to traumatism or to tenosynovitis.

He has been using this preparation for the last five years. He is very well satisfied with it, and feels that it does a great deal of good.

Lanolin and boric acid paste, of course, have their limitations. In the presence of inflammation it does not act. This is a valuable quality, because if it did inhibit adhesions, in cases of peritoneal inflammation, its use would be very dangerous. Adhesions are the life-saving structures in inflammation of the peritoneum. Another fact of importance to be remembered is that lanolin and boric acid paste does not absolutely inhibit adhesions between two adjacent surfaces, which are denuded of their serosa and are held in contact. Therefore, it should be the attempt of the surgeon to see that no two surfaces denuded of serosa come into and remain in permanent contact. The viscera at the close of an intra-abdominal operation should be so arranged, if possible, that long contact cannot happen, and, as a further precaution, the position of the patient should be such after operation that involved peritoneal surfaces will have a tendency to gravitate away from each other; for this reason also the position of the patient should be frequently changed. Drugs which have an active peristaltic action, either strychnine or eserine salicylate, should be exhibited in quantities sufficient to produce active peristalsis. Magnesium sulphate is also a very good drug, useful for this purpose. Any cathartic, stimulating intestinal peristalsis, may be exhibited with profit.

As a further aid to peristalsis, where there is no danger of spreading an inflammation, he applies heat to the abdomen in the form of hot-water bottles, electric pads, etc., which are very beneficial in sluggish peristalsis. Diathermia is one of the most recent but perhaps one of the best means of stimulating peristalsis after operation.

Arterial Hypertension and Benzyl Benzoate.

Musser, in the *New York Medical Journal* of October 16, 1920, states it has been shown conclusively that drugs are of little value in combating high pressure over any length of time. The iodides are of value only in syphilitic cases. The nitrites produce a temporary fall in pressure only, and a tolerance to them quickly follows their prolonged use. They should be reserved for emergencies. Radium-charged water has not been followed by any particular action, as far as he can determine in the few cases in which he has employed it. Of the newer drugs benzyl benzoate has received particular attention as a reducer of blood-pressure. This drug was introduced by Macht in 1918 and came into general use in the fall of 1919. He discovered that this preparation has a marked relaxing action on the unstriped muscles of the body and is capable of relieving spasm of such muscle. On account of this antispasmodic and tonus-lowering effect Macht had the drug tried out in a variety of conditions

which are associated with muscular spasm. He asserts that he received good results in relieving the following spasmodic conditions: Diarrhea and dysentery, biliary colic, ureteral colic, vesical spasm, spasmodic pains in seminal vesicles, uterine colic, bronchial asthma, and arterial spasm hypertension.

It is with this last condition that he is particularly interested to-day, and he recounts his rather brief experience. In a small series of six cases he religiously gave the drug for some weeks. In order to test it out he used but few auxiliary methods, but rather made an effort to see if the benzyl benzoate, plus a few simple general hygienic directions, would lower the pressure. In no case did he see any effect from it whatsoever. Likewise, he has talked with some of his colleagues and they have been almost unanimous in expressing the opinion that it has but little effect on the blood-pressure.

While he has seen little if any result from the administration of benzyl benzoate in the treatment of increased blood-pressure, he has had the opportunity of testing it in two cases of angina pectoris and can testify as to its value in this condition. Likewise in several other painful or disagreeable spastic conditions its action has been truly remarkable.

High Blood-pressure.

BARKER, in the *Ohio State Medical Journal* for October, 1920, states that drugs have their place in the treatment of chronic arterial hypertension, but it is a less important place than was formerly supposed.

If there be constipation it should be overcome, mainly by diet, exercise, and habit formation, but mineral oil and gentle laxatives at night, or morning salines, may sometimes be required as adjuvants. Many hypertensives feel better for a weekly or a fortnightly purge (blue mass and compound extract of colocynth at night, followed by a saline the next morning).

The iodides were formerly given almost as a routine measure to patients with high blood-pressure. Now that we know that the underlying process is not due to syphilis, the iodide treatment has gone out of fashion. Some patients with hypertension undoubtedly feel better when they take iodides. Why, we do not know, though it has been suggested that a decrease in the viscosity of the blood is responsible. Hypertensive patients who also have hyperthyroidism usually feel worse when they take iodides. The severe headaches from which some hypertensives suffer are, as a rule, aggravated by the exhibition of iodides.

The nitrites, too, are used much less than formerly in hypertension. Nitroglycerin, and sodium nitrite, will reduce the blood-pressure temporarily, but without advantage to the patient except in cases of angina pectoris, or in those in which cerebral apoplexy is threatened.

There are many reports in the literature of blood-pressure reduction from the use of radium emanation or of intravenous injection of soluble radium salt. Further studies must be awaited before judgment may safely be passed upon this form of treatment.

One drug is worthy of much more extensive and more intelligent use in hypertensive cases than is common. He refers to digitalis. Not only is it of great value when the heart muscle has evidently begun to flag, but it may be given in moderate dosage earlier with advantage. The circulation improves, renal elimination is favored, and the blood-pressure, both maximal and minimal, may sometimes show a lower range. In a case in which the blood-pressure has fallen from enfeeblement of the myocardium, with or without "mitralization" of the heart, digitalis may restore the blood-pressure to its previous high level with both subjective and objective improvement of the patient.

In the early stages of arterial hypertension, it is desirable to remove all definite foci of infection that are discoverable in

the hope that, by cutting off chronic bacterial intoxication, something may be done toward arresting the progress of the underlying process. Thus definitely infected tonsils, paranasal sinuses, or teeth, chronic cholecystitis, chronic appendicitis, chronic prostatitis, and other local infections, should receive due surgical attention if they be found to exist.

In the later stages of the disease, however, when extensive damage to the kidneys, to the heart, or to the blood-vessels has already been done, care should be taken not to subject the patient to unnecessary surgical risk, and much judgment is needed to discriminate between the cases in which benefit may reasonably be expected to follow surgical interference and those in which its dangers outweigh the prospective benefits.

Undoubtedly it may sometimes become necessary to operate upon a patient with advanced cardiovascular-renal lesions, for example, in strangulated hernia, in prostatic obstruction, in empyema, or in severe chronic infection of the biliary tract. He has been surprised to find how well, in such cases of surgical urgency, patients with high blood-pressure and its congeners bear anesthesia and surgical trauma, especially if it be possible to prepare the patient during a short period before the operation by rest, by diet, and by appropriate measures for strengthening the myocardium, and for detoxicating the body by increasing elimination through the kidneys and the bowel.

One minor surgical procedure is worthy of especial mention for the treatment of hypertensive patients, namely, the withdrawal of from 300 to 500 Cc. of blood from a vein. The bloodletting of our ancestors certainly has its place in the treatment of patients with high blood-pressure; most of the advanced cases, especially the plethoric and the obese, are the better for the loss (by needle) of half a liter of venous blood at intervals. Nature herself sometimes applies this method for us in the form of an occasional spontaneous and profuse epistaxis.

Barker is often asked whether or not the operation of splitting the capsules of the kidneys (Edebohl's operation) is advisable in the contraction of the kidneys associated with chronic arterial hypertension. In his experience it has been of no benefit in this form of chronic renal disease.

Any full account of the therapy of the various complications that threaten life, as the end of this high blood-pressure process is approached, would of itself require a long paper. In summary, however, Barker reminds us of the principal measures that may be used. Thus:

1. In complicating myocardial insufficiency, physical and mental rest, a few days of Karell diet, followed by "cardiac diet," consisting of five small meals a day rather than three large ones, massage, morning saline and evening sedative, and the use of digitalis or strophanthus.

2. In complicating angina pectoris, avoidance of the things that bring on the pain, careful regulation of the diet and of the emunctories, prohibition of the use of tobacco, and systematic administration of nitroglycerin or of other nitrites both in and between attacks.

3. In complicating pulmonary edema, hypodermic injections of morphine and atropine.

4. In complicating "cardiac asthma," morphine, nitrites, and digitalis.

5. In complicating cerebral apoplexy, derivatives, ice-cap to the head, and rest.

6. In complicating uremia: (*a*) protection of the kidney (by diet and vicarious elimination by means of mild purgation, diaphoresis, and bloodletting); (*b*) support of the heart (by rest and cardiotonic measures); (*c*) symptomatic treatment of the nervous, digestive and cutaneous manifestations; and

7. In complicating infections, immediate rest in bed, good nursing, protection of the kidneys, support of the heart, and, in addition, special measures directed toward the

local or general treatment of the infection itself.

In these end-stages the physician can do much to ward off an impending danger, to mitigate suffering, and to solace patient and friends. But both physician and patient do best at the very end of the hypertensive process to face reality with courage, to avoid doing too much, and especially to prevent undisciplined, wishful thinking from inaugurating a busy and meddlesome therapy that not only does the patient no good, but brings torture to him in those last hours that might reasonably be made euthanasic.

Reinfection and Curability of Syphilis.

JACOBI in the *Archives of Dermatology and Syphilology* for October, 1920, summarizes his conclusions as follows:

1. The question, "Is syphilis curable?" cannot be answered definitely in the light of our present knowledge.

2. The occurrence of reinfection in syphilis may be accepted as an established fact.

3. Reinfection, however, is by no means evidence of curability. These two conceptions do not stand and fall together, as many believe; they are not contingent on each other, and should be dissociated in the interest of clear thinking and unbiased judgment.

Treatment of Generalized Psoriasis.

MOOK, in the *Archives of Dermatology and Syphilology* for October, 1920, states that in the treatment of the body two ointments are necessary—one to prevent as much as possible and relieve the chrysarobin dermatitis. First, a soothing application is used: 1-per-cent ichthyol (or a substitute), corn-starch and zinc oxide, 6 per cent, each, in white petrolatum. This is to be applied to the normal skin between patches before the chrysarobin ointment is applied. It is also to be used after chrysarobin dermatitis has developed. Second, a chrysarobin ointment, which consists of 2-per-cent phenol and 10-per-cent chrysarobin in white petrolatum, is applied. These amounts will be advantageous in a majority of cases, but may be decreased or increased when advisable. The patient should be warned of the danger of conjunctivitis from chrysarobin and instructions given to prevent its occurrence.

After the ichthyol or soothing ointment has been applied to the normal skin between the lesions, preferably with a wooden tongue depressor or spatula, the chrysarobin ointment is applied to the lesions with a swab made of cotton or gauze twisted on the end of a stick. Stiff brushes are to be avoided as too irritating. Corn-starch or talcum powder is then dusted plentifully over the entire body and the patient advised to abstain from walking or exercising as much as possible, though it is not necessary to remain in bed. Bandaging the extremities is not necessary and causes discomfort. A large armchair in the room will add to comfort.

Applications are made once daily until the chrysarobin dermatitis begins to develop, and it is at this point that the greatest skill in the treatment must be manifested. The chrysarobin must be discontinued if severe reaction develops. An occasional corn-starch and soda bath may be advisable as a rest and for cleansing purposes, using two cups of starch and one cup of baking soda to the bathtubful of warm (not hot) water.

The skin will be discolored after the first treatment, and after three to six days the skin generally becomes much reddened, but with less real inflammation than is usual when chrysarobin alone is used. The ointment is not to be discontinued unless the distress from burning and pruritus is unbearable. If the chrysarobin must be discontinued for a few days, the soothing salve is applied twice daily until it may be resumed. In some patients the chrysarobin may be applied continuously until all lesions have disappeared. In a few, two applications daily are possible, but in a majority

rest is indicated after five or six days. Occasionally persons with idiosyncrasy will be encountered, and in these the method is useless.

The objections to the method are many and individual skill must be developed. Certainly it is a dangerous weapon for the unskilled. The confinement to a room or hospital, the destruction of a certain amount of clothing, and the physical discomforts that may be encountered are obvious, but when necessity or desire demands a rapid removal of lesions with a favorable assurrance of success, the writer can heartily recommend it.

A Menace in the Low Protein Diet in Skin Diseases.

MICHAEL, in the *Archives of Dermatology and Syphilology* for October, 1920, states, in concluding his article on this subject:

1. Most patients, on a low protein diet, receive an increased carbohydrate ration.

2. A diet rich in carbohydrates is contraindicated in patients who present a prediabetic condition.

3. Patients who have psoriasis or other dermatoses, in which a low protein diet is often resorted to, may also be prediabetics.

4. Therefore, before a special diet, low in protein and rich in carbohydrates, is instituted, the sugar tolerance of the patient should be ascertained.

Lactic Acid Milk.

In the *Journal of the American Medical Association* of October 2, 1920, SHERMAN and LOHNES state that they have worked out a method for the use of lactic acid milk which is very simple.

It is well known that the fermentation of lactic acid milks continues up to a certain point of fermentation—that is, of acidity. At about 60, as measured by decinormal sodium hydroxide solution, spontaneous fine clotting occurs. At about 170 to 190 the acidity destroys or renders inactive the fermenting bacillus, and the process consequently of itself ceases.

They have taken the milk, either skimmed or whole, and in the morning added the ferment (1 ounce of ferment to 31 ounces of milk) and stood them away in a warm place till a convenient time the next morning. Knowing by numerous tests that the acidity has reached about 170 to 190 by that time, they dilute the skimmed or whole lactic acid milk with an equal amount of skimmed or whole sweet milk that has been boiled, and then have the desired acidity of from 75 to 95. Because the acidity is above 60, there occurs a spontaneous fine clotting of the added sweet milks with a resulting homogeneous, smooth, clotted mixture. This mixture of lactic acid and sweet milks is then boiled or not, as we desire. It is then further modified, as the case demands, and put away on the ice. It keeps nicely, changing very little in the following twenty-four hours, the change being much less if boiled a second time.

This is a simple method, which can be carried out even in the household of the ignorant. It requires merely the making of a certain amount of whole or skimmed lactic acid milk, to which can be added an equal amount, or more, of whole or skimmed boiled sweet milk. The small clots, which are formed during the process of fermentation, are flocculent in character and are very easily digested. Should the infant reject the lactic acid milk of correct acidity, the curds are small and soft, and show evidence of prompt digestion. To supply the carbohydrate needs they have added corn syrup; first, because of its contained variety of sugars, and secondly, because it is cheap. They have had cultures taken of an unopened can, and have found it germ-free.

Their series of cases tested on lactic acid milks has amounted to only about twenty-five. Given a mixture of the proper acidity, they find the infants very quickly seem to like it, and furthermore, those with rebellious stomachs retain it nicely. The effect

on the stools is marked and quickly obtained. The foul, putrefactive odor, so common in this class of hospital case, promptly ceases, and the stools become even, smooth, and of good color.

The infants seem rapidly to become less toxic, as is shown by the disappearance of various signs and symptoms:

Their appetites improve, and they take the formula well and are likely to retain it.

They soon lose their ashy-gray color. Their mucous membrane, especially of the lips, shows a decided betterment in color. This occurs before the gain in weight has been marked.

Their temperature becomes more stable, and an early monothermia occurs.

They soon become less fretful—in other words, are more happy.

Their sugar tolerance seems less easily broken, and gas formation is less likely to complicate the condition.

The loss of weight, or stationary weight, is soon likely to be overcome by a substantial weekly gain, and caloric feeding seems easier to reach.

The age of the infant seems to make very little difference with lactic acid milks. Finkelstein does not advise protein milk before three months of age, though this rule is not inflexible. But they have used lactic acid milks in the very young with as good results as with older infants. As an example, one of their patients was a premature infant of seven months' gestation, weighing 4 pounds at birth. At the end of its first month it weighed 5 pounds. It was started on its second day of age with a one-half skimmed lactic acid milk. This was gradually raised to a two-thirds mixture of lactic acid milk, which was made of one-half skimmed lactic acid milk and one-half whole lactic acid milk. This is approximately a 2-per-cent fat mixture.

The therapeutic effects of lactic acid milk or buttermilk are too often only superficially understood. The curds formed from it are small and easily cared for. The acidity seems to stimulate both the gastric and the intestinal function, and the sterilization of the protein fermentation of the intestinal canal is marked. This change of intestinal state markedly lessens the absorption of toxic products, and the whole process of metabolism is hence beneficially affected.

Therapeutics of Thick Cereals in Disorders of Infancy.

In *Northwest Medicine* for October, 1920, DURAND reminds us that there are many breast-feeding cases which give us considerable trouble. First of all there are the babies with colic. Some of these are fat and overnourished. Some are much under weight and gain poorly.

Current, of Spokane, says that colic cases are promptly relieved if given one ounce of 3-per-cent barley water before nursings. The marked effect on peristalsis noted in giving thick cereals in his pyloric obstruction cases and the similar effect of starch enemas in quieting peristalsis in the large bowel in diarrhea, with relief of griping pains and tenesmus, made this sound rational. Accordingly he has used the barley water in the overnourished colic cases and the thick barley mixture in the undernourished babies. The relief from pain has been very gratifying in the majority of cases. He is convinced that it offers a remedy much more rational and more effective than catnip and fennel, soda, peppermint, asafetida, or any one of the thousand and one remedies for colic. In the cases which are not gaining the results with the thick barley jelly have been surprising.

He reports the instance of twin babies, a boy and girl, three weeks premature. They were five weeks of age. Both were regurgitating some of the food, crying a great deal, bowels constipated. They were being nursed at three-hour intervals. The weight at birth was 4 pounds 12 ounces. Weight at examination: girl 5 pounds 1 ounce; boy 5 pounds. Barley jelly, one teaspoonful, was ordered before three feed-

ings daily and a four-hour feeding interval instituted. One week later each baby gained 11 ounces. The stools were normal. The mother said they seemed comfortable and now cried very little.

The result in these cases was particularly brilliant, but in most of the cases in which he has used the barley jelly to supplement mother's milk it has acted as a stimulus to rapid growth. In some of the cases he has made up barley mixtures with part milk, and in some cases used dextrimaltose in place of cane-sugar.

To summarize: Thick cereal mixtures, whether made from farina, rice, or barley water, may safely be given in amounts of one to four tablespoonfuls at a feeding.

They are better retained than liquid feedings.

They check peristalsis and pass through the duodenum in pyloric obstruction cases better than fluids.

His results, as well as those of Porter and Sauer, indicate that they should be given a trial before operation is advised.

Thick cereal mixtures are of service in neurotic vomiting, certain types of malnutrition, and particularly valuable to supplement breast feedings.

The cereal mixtures, because of their action in allaying excessive peristalsis, are the most effective remedy we have for the treatment of colic in infancy.

The Effect of Mercury Salicylate on the Wassermann Reaction.

SUTTON, in a letter to the editor of the *Archives of Dermatology and Syphilology* (October, 1920), in referring to a previous article by Goodman on this subject, says:

"I thought all syphilologists were past that mile-post of knowledge which marks the use of liquid petrolatum as a vehicle for intramuscular injections. It has repeatedly been shown that the material is not absorbed, and that about all the physician gets is a paraffinoma for his pains.

"I think Goodman also erred in the matter of dosage. Few of us would expect to secure permanently beneficial results following one-grain doses of mercury salicylate, injected at intervals of one week, even if an absorbable medium were used.

"I have been employing mercury salicylate, in an olive oil and lanolin emulsion, for more than twelve years, and while I occasionally branch off and try some other highly recommended preparation, I have invariably returned to the old standby, for I am convinced that when properly employed it is one of our most potent and reliable remedies in combating syphilis."

The Corpus Luteum Treatment of Hyperthyroidism.

HOPPE, in the *Ohio State Medical Journal* for October, 1920, states that he has been using the corpus luteum now for six years. He was impelled to try it at first in a very acute case of Graves's disease because of the presence of amenorrhea which had persisted for a year. This patient had had prolonged rest and the usual medicinal remedies, but went from bad to worse. She had lost sixty pounds in weight. She made a complete recovery and has remained well for the past five years. Since his last report in 1918 he has treated twenty-five additional cases, and has occasionally seen most of the cases reported previously.

None of his fifty cases were doubtful ones. In making the clinical diagnosis of hyperthyroidism, he has established for himself the rule that if there is no bruit in the thyroid gland he does not make the positive diagnosis of hyperthyroidism and places the case in a doubtful category. All of his cases were diagnosed as positive. One of them, reported in 1917, died of influenza; all the others are doing well, and some of them seem to have established a normal balance of the endocrine glands and do not take corpus luteum. The others are comfortable when they take corpus luteum.

He has had no cases of hyperthyroidism

operated on since 1917. In the last group of twenty-five cases one man died twenty-four hours after he had seen him in consultation. The patient had had hyperthyroidism for years—was in an acute relapse at the time of the consultation, and was suffering from and died of acute myocardial disease leading to cardiac dilatation. Three or four of these cases were very acute—one had lost sixty pounds and the other seventy pounds; both of these latter cases have made practically a complete physiological recovery and have taken up their former occupations. Both were women. Both had extreme cardiovascular symptoms, exophthalmos, diarrhea, and rapid emaciation. One, the wife of a physician, has made a perfect recovery; the other has still some exophthalmos and an enlarged thyroid, but insists that she is well, and has worked in a factory for the past year. This second group contains a surgical case which had the thyroid removed, but still presented all the objective signs and subjective distress of hyperthyroidism. She has improved under the treatment. Three of the other cases are very much improved; all of them are satisfied and relieved. In the latter group of cases there is but one male, and he has done well on extract of pituitary gland.

The most notable and the most rapid improvement is seen in those showing cardiovascular symptoms and general nervous manifestations. The pulse-rate drops quickly, the general subjective symptoms caused by the circulatory disturbances subside, the loss of weight stops, digestion and appetite become normal, the nutrition improves, and the patient takes on weight.

While Hoppe looks upon the corpus luteum as the specific agent in the treatment of Graves's disease, he has not discontinued the symptomatic treatment, nor the attention to hygiene and diet, for after Graves's disease has been established we see general signs of pluriglandular disturbance. The digestive disturbances, the increased metabolism, and the rapid emaciation all demand symptomatic treatment. On account of the general nervous and mental irritability, cases of Graves's disease are not very easily managed, nor are they as a rule faithful to the treatment. He gives careful attention to the diet, allows very little physical exercise, and prescribes much rest in bed. Quinine hydrobromate and extract of belladonna are of great value. He usually gives two grains of corpus extract, three grains of hydrobromate of quinine, and one-tenth grain of the extract of belladonna after each meal. After the cases show improvement he diminishes the dose to two per day, and even when the patients are apparently well he still gives one dose per day, usually at bedtime. As in a previous report, he finds that patients who take the treatment irregularly or who discontinue the treatment show a tendency to relapse and to have an exacerbation of all symptoms. He believes that the exacerbations and remissions which are ordinarily seen in Graves's disease are due to the fact that defective ovaries may occasionally produce even several months in succession normal corpus luteum, and during these periods the patient shows an improvement. He believes that in the cases which have recovered, the use of the corpus luteum has tided the patient over and assisted her in establishing a compensatory secretion by one of the other endocrine glands, thereby bringing about once more an endocrine balance with a permanent relief of all the symptoms.

The theory on which the above treatment is based, therefore, is that hyperthyroidism is caused by a defective secretion of the interstitial sex glands; that the hormones of the interstitial sex glands have an inhibitory and regulatory action on the secretion of the thyroid; that when the function of these interstitial glands is deficient, there is a lack of physiological inhibition of the thyroid, with an excessive secretion and, therefore, hyperthyroidism. In other words, hyperthyroidism and hypo-ovarianism are synonymous conditions.

As he has said before, the mere administration of corpus luteum alone will not relieve these cases. Even a superficial knowledge of Graves's disease would disabuse our minds of this idea. The cases require careful dietetic, hygienic, and symptomatic treatment. But whereas his previous experience has been that most cases with the above symptomatic treatment combined with quinine hydrobromate and extract of belladonna showed but indifferent results, the use of corpus luteum, in conjunction with this general treatment, gave most satisfactory results.

The treatment of hyperthyroidism with corpus luteum is comparable with the treatment of myxedema with thyroid extract. As long as we administer thyroid extract, cases of myxedema and hyperthyroidism do very well. But the administration of thyroid extract will not make a defective thyroid resume a normal function. Nor will the administration of corpus luteum cause a deficient ovary to produce a mature Graafian follicle. But it has been Hoppe's experience that, as long as we administer corpus luteum in Graves's disease or in its period of exacerbation, the patient is improved and can be kept in a fairly normal condition.

Ocular Accidents Attributed to Arsenical Products.

The *New York Medical Journal* of October 2, 1920, writing editorially on this subject, points out that the arsenical compounds, both mineral and organic, have been the cause of various accidents, but ocular disturbances attributed to these products are the most serious of all. The arsenical products that have produced slight ocular accidents having a good prognosis are the cacodylates and sodium and potassium arsenate; those producing serious disturbances are atoxyl, arsacetine, hectine, and hectargyre, as well as salvarsan and neosalvarsan.

Regardless of the very extensive use made in recent years of the cacodylates, lesions of the optic nerve have never been recorded. The few cases reported of optic neuritis following the internal exhibition of sodium or potassium arsenate have been neuritides presenting the type of toxic neuritis or infectious neuritis with a central scotoma, without any change in the peripheral visual field but offering a slight irregularity in the outline of the papilla. The prognosis is favorable in these cases.

Atoxyl produces complete and incurable atrophy of the optic nerve following a retrobulbar neuritis, the symptoms being a narrowed visual field, decrease of the pupil reflex, white papillæ, and a narrowing of the vessels of the retina. Arsacetine acts in the same way, only its toxicity is somewhat less. Hectine and hectargyre produce identical lesions of the optic nerve, but nevertheless not so serious as those resulting from atoxyl.

However, all things considered, ocular complications have been reported too frequently from these products, so that preference should be given to salvarsan, arsenobenzol, or neosalvarsan. The ocular accidents attributed to salvarsan may be placed in three categories, namely, accidents in the uveal tract, those of the optic nerve, and accidents arising in the motor nerves, the globe of the eye, and the eyelids.

The accidents arising in the uveal tract —iritis and choroiditis—attributed to salvarsan are, in reality, merely syphilitic manifestations and are not the result of the drug. Their early appearance is proof of this. Likewise, the optic neuritis attributed to salvarsan would seem also to be of a syphilitic nature; it is neither more frequent in occurrence nor earlier in appearance than before salvarsan came into use.

As to the disturbances of the motor nerves of the eye, they are simply manifestations of the syphilitic virus and cannot be attributed to salvarsan. The cases recorded by Bizard, Sicard, Guttmann, and others were due to meningeal phenomena

which reacted upon the cranial nerves, as might be expected; these meningeal phenomena were noted at the very onset of the syphilis and before treatment with salvarsan had been given.

It is also safe to assume that what has been said of salvarsan applies as well to neosalvarsan, arsenobenzol, and other recent products of arsenic, and that with very small doses repeated daily or every second day, either subcutaneously or intravenously, no accidents of any description need be feared.

Blood Matching as a Routine in Pregnant Patients.

In the *Boston Medical and Surgical Journal* of October 7, 1920, TITUS states that the trend in obstetrics, as in all other branches of medicine and surgery, is toward prevention. We examine routinely thousands of specimens of urine for the occasional one containing albumin; we take many routine blood-pressures, watching for the important rise; we do careful physical examination to rule out the infrequent patient unfit to have babies; we examine many pelves to find the unusual one which contains some pelvic obstruction to safe delivery; we do many Wassermanns for the one that proves positive—all this to find the occasional patient who is in one sense or another obstetrically abnormal. That very few abnormal patients are so found is no argument against trying to find them. All this routine is essential if obstetrical disasters are to be avoided. The ideal of obstetrics is not reached until we have done all that can be done to safeguard our patients against any and all disasters.

The accidental bleeding cases are the ones which by no examination can be anticipated. Detached placentas will occur, placenta previas give warning only when they bleed, postpartum hemorrhages will come when least expected. For all loss of blood there is nothing like replacing blood, and severe shock is best treated by blood transfusion. Time spent in getting ready for safe transfusion in hemorrhage or shock patients is time lost. The technique of blood transfusion has been so perfected that it is known to be unsafe to give blood to any one unless the blood of the donor and the blood of the recipient have been matched and found compatible. Occasional instances of incompatibility have been observed in the matching of bloods of people in the same group. Every one who is in group four is a potentially safe donor, but even though the person be in group four it is clinically unsafe to transfuse with that person's blood until his blood has been matched with the blood of the person to whom it is to be given; and all this takes a certain amount of time—time which may be very, very precious, and time which may be entirely saved. It is a perfectly simple matter to match the blood of the pregnant patient with her husband's or with some person's in group four, any time within the last month or six weeks of expected delivery. Matching blood means only a few minutes if one is prepared to do it, and if one has a safe donor at hand when the need of transfusion arises much time otherwise spent in getting a donor can be saved.

For some time it has been the custom of Titus to match the bloods of his patients with the blood of the husband and with the blood of a group four person. This has been done within six or eight weeks of expected delivery. Telling the patients of the very extraordinary condition that so rarely occurs to warrant this procedure meets with their full approval. Strangely enough only one of the husbands whose blood he has matched with the wife's has been compatible; on the other hand, the group four person has been compatible with the pregnant patient's blood in every instance. One hears occasionally of patients who have died because of hemorrhage, when the time spent in getting ready for the transfusion was too long. If one of these patients can be saved by the simple routine procedure of blood matching the

habit is well worth while. One such disaster is enough to warrant this routine on many, many patients. Such routine, of course, is not practicable in clinics taking care of patients at home. So far as hospital practice goes, all patients arriving who have had any hemorrhage and cases in which the possibility of hemorrhage is present should be matched in order to meet the emergency if it should arise. Among men doing obstetrics and obstetrics alone any procedure which tends to lessen the dangers of delivery for their patients certainly is worthy of consideration. It is upon this basis that blood matching as a routine is advocated.

The Prevention of Diabetes Mellitus.

WILLIAMSON, in the *London Practitioner* for October, 1920, states that from what we know of the etiology of diabetes the following recommendations appeared justified with a view to postponing the onset of the disease, or possibly preventing it:

1. It is desirable for all, even for those who are in good health and have no grounds for fearing diabetes, to avoid great excess of sugar, jam, sweets, chocolates, sweet foods, and sweet drinks.

2. If, through family history of diabetes, race tendency to the disease, or on other grounds, the onset of diabetes is feared, but sugar has never been detected in the urine, then the following precautions appear advisable:

The amount of sugar in the diet should be restricted.

Sugar should not be added to any food or drink. Coffee and tea, puddings, etc., should all be taken without sugar. All very sweet food, very sweet fruits, and very sweet drinks, and all articles containing much sugar, should be generally avoided (such as honey, syrup, treacle, dried sweet fruits, figs, dates, raisins, currants, prunes, jams, marmalade, chocolates, and sweets of all kinds; sweet drinks such as port, tokay, champagne, and other sweet wines; whisky and sugar, gin and sugar, herbbeer, liqueurs, fruit juices and syrups, cocktails, gin, and ginger beer). Sweet lemonade and cider should be taken only in small amount.

Excess of alcohol should be carefully avoided, especially excess of beer and alcoholic beverages containing much sugar. Excess of alcohol probably increases the risk of diabetes in certain cases. Foods or drinks containing only small quantities of sugar may be safely taken by this class of cases. Starchy food and starch carbohydrates may be taken in the usual quantities.

Excess of food should be avoided, since this is probably a predisposing cause in some cases.

If very large quantities of food have been taken and difficulty is experienced in restricting the amount, then foods like green vegetables and jelly, which contain little absorbable foodstuffs in the large bulk consumed, may be recommended to be taken freely. A tendency to obesity should be checked, if possible, since the mild form of diabetes is often preceded by obesity.

It is probably better to take the daily ration in frequent small meals, since sugar is better destroyed if slowly absorbed.

Sufficient physical exercise is very important.

Excessive brain-work and severe brain-strain should be avoided, if possible.

The Effect of Salt Ingestion on Cerebrospinal Fluid Pressure and Brain Volume.

In the *American Journal of Physiology* for October, 1920, FOLEY and PUTNAM remind us that Weed and McKibben demonstrated that it is possible to reduce the cerebrospinal fluid pressure and diminish the bulk of the brain by injecting hypertonic solutions into the blood stream. Conversely, they showed that the pressure and the bulk of the brain could be increased by the injection of hypotonic solutions. Their

work has been repeated and their general conclusions confirmed.

These authors have shown that the introduction of hypertonic salt solutions into the gastrointestinal tract has a similar effect. This route of administration is more convenient, and by its use the disturbances of circulation and respiration common with intravenous infusions are avoided.

Twenty to thirty cubic centimeters of a 30-per-cent sodium chloride solution introduced into the duodenum or rectum of an average sized cat produced a maximal fall of cerebrospinal fluid pressure. Following such doses the average fall of pressure in a large series of experiments was 258 mm. of water. Larger doses added nothing to the extent of the fall. A dose of 5 Cc. produced a fall of 104 mm. of water, and intermediate doses gave roughly proportionate results. Following this fall in pressure there is a gradual rise. Thus, seventeen to forty-eight hours after such injections, four animals showed pressures averaging 45 mm. less than the average normal.

Sodium chloride solutions in only slightly hypertonic concentration are also effective in causing a fall in cerebrospinal fluid pressure, although to produce appreciable changes large doses are required. Doses of 40 to 150 Cc. of 2-per-cent sodium chloride solution caused falls of pressure averaging 97 mm. of water, in cats.

Saturated solutions of sodium sulphate, which is not absorbed from the gastrointestinal tract, produced qualitatively similar results, but less in extent and at a slower rate. With concentrated dextrose solutions the fall is still less and its rate still slower.

Water injected into the duodenum produces a small rise of pressure in the normal animal, but it disappears more rapidly than the fall incident to salt ingestion. If the animal has been given a concentrated saline solution the day before, the rise in pressure following the administration of water is more marked and of longer duration.

Such changes in cerebrospinal fluid pressure were shown to be independent of changes in arterial or venous blood-pressure.

These changes of fluid pressure are accompanied by a decrease in the size of the brain.

The manometer readings (pressure values) obtained after salt ingestion are not due solely to changes in brain volume and capacity of the cerebrospinal fluid spaces, but primarily represent new ratios between secretion and absorption of cerebrospinal fluid.

An Improved Method in the Treatment of Otitis Externa.

PRENN, in the *Boston Medical and Surgical Journal* of October 14, 1920, states that although we classify this condition as furunculosis on account of its etiology, clinically it presents a different picture and runs an entirely different course. We very seldom see here a furuncle coming to a head, unless in the superior part of the canal where the cartilage is wanting. There is no give to the skin of the canal; it is strongly adherent.

Occasionally we meet with a cycle of infection as in other parts of the body. This is especially true in people with a furuncular diathesis. Various parts of the canal will be infected in consecutive order. Recently a case like this came under his care in a patient with furuncular diathesis whose canal went through the cycle of infection, starting with a furuncle superiorly that came to a head, and after the entire canal was healed the tragus of the same ear became infected. As a rule, however, the infection from the start is confined either to one part or, if severe or when it has taken place in different parts simultaneously, to the entire canal.

Subjectively the patient experiences pain, which is sometimes excruciating. He feels it especially when the condyle of the lower jaws bears pressure on the external canal,

as in eating. He cannot stand any pressure or traction of auricle at all, and of course cannot lie on the affected side. The patient experiences difficulty in hearing and complains of a sense of fulness and becomes irritable.

Objectively there are an infiltration and edema of varying degree to complete closure of canal. The drum membrane may become thickened and red, but not bulging, due to the extension to the outer layer of the drum membrane from the canal, and it clears up with the latter. By extension from the canal a postauricular abscess may form in children when the infection is posteriorly, or infection of parotid through the fissures of Santorini when the infection is anteriorly. There may be a cellulitis of the neck downward.

When the inflammation is slight, heat and medicinal applications may effect a cure. Various medicines are being used by different men, but solution aluminum subacetate properly prepared and properly and gently applied gives very good results. When pus is present he makes deep incisions to obtain pus. Twenty-four hours after the operation he inserts a gauze strip soaked in the above solution into the canal, and the patient keeps same moist with the solution by means of a medicine dropper. The dressing is changed daily for a few days. When there is marked edema, especially when the entire canal is involved, incisions are made on all sides of the canal under general anesthesia, followed by the application of heat and in twenty-four hours by the above solution.

The question of the kind of heat is important. Since the patient cannot stand any pressure, the difficulty of applying different poultices and holding them there is obvious. Especially difficult is it on lying down. He cannot lie with his sick ear on the poultice, neither can he stand the poultice resting on his ear. The poultice cools off readily, and that is another disadvantage. It is certainly uncomfortable, to say the least; it retards the healing, and it adds a great deal to his already taxed nervous condition.

He therefore found the use of the electric bulbs 50-100 candle-power very beneficial. The patient can sit with the sick ear turned to the lamp, or lie on his good side with the lamp lowered from a flexible or folding stand with a shade over it bent right over his sick ear, and get the benefit of a uniform heat.

Effect of Tonsillectomy on the Recurrence of Acute Rheumatic Fever and Chorea.

ST. LAWRENCE, in the *Journal of the American Medical Association* of October 16, 1920, in summarizing his paper, states:

Eighty-five children, each of whom had presented one or several of the rheumatic manifestations before the tonsils were completely removed, were observed during an average period of three and one-half years after the operation was performed.

The tonsils were markedly hypertrophied in 13 per cent of the cases, moderately so in 69 per cent, and not enlarged in 18 per cent. They were the site of recurrent inflammation before the tonsils were removed in 73 per cent of the cases. "Sore throat" recurred after removal of the tonsils in 7 per cent of these. At least two operations were necessary before the tonsils were completely removed in 22 per cent of the cases.

The tonsillar lymph nodes were enlarged in 100 per cent of the cases before the operation was performed, while in 59 per cent they were impalpable afterward.

One or more attacks of acute rheumatic fever had occurred in forty-two cases before the tonsils were removed. After tonsillectomy there was no recurrence in thirty-five cases, or 84 per cent.

One or more attacks of chorea had occurred before the removal of the tonsils in forty cases, and there was no recurrence after the operation in twenty cases, or 50 per cent.

Sixty-one cases showed myositis and

bone or joint pains before the operation was performed, and there was no recurrence in forty-seven cases, or 77 per cent.

Fifty-eight cases of organic disease of the heart were present in the series. Twelve of these patients had suffered at least one attack of cardiac failure before the tonsils were removed. One patient suffered one attack afterward.

The exercise of tolerance in the cases of cardiac disease seemed to be favorably influenced by tonsillectomy in the instances in which indications existed for the removal of the tonsils.

Nutrition and general health were improved, and intercurrent disease was less common after the tonsils were removed.

Tonsillectomy (complete removal of the tonsils) would seem to be the most important measure at present available for the prevention of acute rheumatic fever and the allied rheumatic manifestations.

Sodium Biborate in the Treatment of Epilepsy in an Asylum.

McCartney, in the *British Medical Journal* of October 9, 1920, states that on the male side of the institution with which he is connected there are about 60 male epileptics. The majority are chronic cases, and a large number of them have been resident for many years.

Formerly the routine treatment was a large dose of potassium bromide (gr. xxx) night and morning. Examination of the ward books, in which a record is kept of all fits in epileptic patients, shows that this has had little effect in reducing the number of fits or bringing about any mental improvement. The only change noticeable was a lessening of excitability and an increase of mental confusion.

Sodium biborate is mentioned in medical text-books as an alternative to potassium bromide. Eight months ago he decided to try a mixture containing potassium bromide and sodium biborate. The treatment was commenced on December 27, 1919, on one patient. The results were so striking in his case, after a fair trial, that it was decided to apply the treatment more widely. The benefit of the treatment has been very marked in all the wards; in two, where the treatment has been in use for four months, the fits have been reduced by 64 per cent, and in two other wards in which the treatment was tried about six weeks there was a reduction of 68 per cent, and this amongst patients who formerly had fits at regular intervals. It is interesting to note that four of the patients have had no fits since commencing treatment. Previous to treatment three of them never went longer than eight days without having fits, and the other averaged twelve days and then had a bout of from three to five fits.

The total number of patients in whom the above treatment has been tried so far is forty-two; in all there is a marked improvement in the mental state of the patients, and in all except one the number of fits has been reduced. In addition to the marked mental change and lessening of the fits, other points noticeable are the great reduction in the amount of sedative used and the marked diminution in the number of accidents which occur.

The Influence of Diuresis on the Elimination of Urea, Creatinine, and Chlorides.

In the *Journal of Pharmacology and Experimental Therapeutics* for October, 1920, Marshall states that the effect of the ingestion of large quantities of water (water diuresis) on the elimination of creatinine, urea, and chlorides has been studied in normal men and dogs. The urine volume is frequently increased twenty-fold or more; creatinine is not increased to a measurable extent; urea is increased definitely, but never more than twofold; chlorides are apparently increased, but the increase is variable and generally less marked than that of urea. The increases in urea and chloride do not correspond with the maxi-

mum increase in water excretion; in fact at the height of the diuresis the chloride elimination generally decreases. During water diuresis the chloride of the plasma may decrease, while the concentrations of urea and creatinine in the plasma do not vary appreciably.

The Treatment of Goitre with Radium.

CLAGETT, in the *Illinois Medical Journal* for October, 1920, asserts his belief that radium possesses the ability to kill a diseased cell or a new growth cell when five times the same dose would be necessary to kill a normal adult cell. Also when applied to a blood-vessel there is a swelling of the tunica intima followed by an obliterative endarteritis in the smaller vessels and diminution of the caliber of the larger ones. Now whether the toxic secretion be due to the additional blood supply or to the activity of the new-formed cells in the gland, or to both, it will be affected by the radium action. There is this further advantage in using radium, that while diffuse action over the entire gland will eliminate the toxic cells, yet the normal healthy tissue will be left untouched provided the dosage can be accurately estimated. Further, the blood supply will be reduced much more evenly throughout the gland than can be done by ligation of some of the thyroid arteries.

We also see that radium can be used not only in a case suitable for a surgeon, but in cases in which the surgeon is compelled to decline to operate, and even in cases in which the surgeon has operated and failed. The thymus and lymphatic system can be, and are, rayed, which may explain the success of radium in a case in which operative removal of a part of the thyroid has not been successful.

So far the literature shows no death resulting from radium therapy, and there is a marked advantage over the *x*-ray in that the dark discoloration of the neck following *x*-ray treatment has not been observed. Radium can be used upon a nervous patient where the *x*-ray would be prone to cause excitement, and furthermore the radium can be carried to a patient at home.

The following is a summary of his own work. He has treated to date 47 cases of exophthalmic goitre with radium—the first case being treated in September, 1917. The patients' ages have varied from 16 to 74 years. Two were of the ages of 16 and 19, both with pronounced exophthalmic goitres. Of these cases six had already been operated on with recurrence of symptoms as bad or worse than before. Seventeen cases were declined as operable risks by some of the best surgeons. He has had to ray eight cases a second time as the dosage was inadequate, and while the patients improved, the first raying did not give sufficiently satisfactory results. Last October, in a paper read before the Radiological Society of North America, at Chicago, Claggett stated that one patient who had taken up Christian Science was apparently not benefited, but he is able to report that recently this patient's sister informed him that the patient is feeling entirely well and that she now ascribes her recovery to the radium treatment. Two cases with very bad broken compensation of the heart have died since treatment from acute dilatation, one three months after treatment, the other five and one-half months, though in both these cases the pulse had slowed an average of thirty beats and the nervous symptoms were remarkably reduced. In one case out of five there has been no reduction of the goitre; the circumference of the neck has diminished from three-fourths of an inch to three and a quarter inches in the others. One woman's goitre did not decrease until thirteen months had elapsed, and then suddenly went down one and five-eighths inches in less than two months.

The exophthalmos has usually been the last symptom to disappear and has remained in five of the cases. The pulse-beat has been reduced twenty to fifty beats. Nervous symptoms and tremors have dis-

appeared entirely and the patients gained in weight and general well-being. There has been symptomatic cure in all of the cases treated with the exceptions noted.

In concluding, he states his belief that radium should be given a trial in exophthalmic goitre for these reasons:

1. There is no mortality, no scar or pain, no long hospitalization. Three or four days suffice for the treatment.

2. Its advantages over the *x*-ray are: no discoloration of the neck, less time consumed in the treatment, simpler to apply.

3. The thymus gland can be treated.

4. While surgery in removing proliferating cells leaves others behind, and by ligating still leaves some of the blood supply more or less undisturbed, the selective action of the radium ray to a much greater degree destroys the harmful cells, while not disturbing the normal cells, and also causes a much more symmetrical diminution of the blood supply.

5. It can be used in cases in which surgery fears to venture or has failed.

6. Surgery has not been necessary after the radium treatments in a single one of his forty-seven cases, some of them extending back nearly three years.

Pyloric Stenosis in Infants.

SMITH, in *Northwest Medicine* for October, 1920, states that every case of persistent vomiting occurring in a young infant should be carefully investigated with the possibility of stenosis of the pylorus in mind.

In milder cases the possibility of spasmodic obstruction should be considered, and the relation of the vomiting to any existing nervous diathesis should be investigated. As in adults, gastrointestinal symptoms may have an origin outside the abdominal cavity. In this connection the unstable equilibrium of the infant's nervous organization should be lost sight of.

Improper food is not the only cause of vomiting. Sometimes the receptacle is deranged physiologically, mechanically, or both.

Changes in an infant's food, especially if from mother's milk, should only be made for sufficient cause, with a rational idea of what is to be accomplished, and with an adequate appreciation of the responsibility undertaken.

No child should be allowed to die of starvation on account of pyloric stenosis. An operative death, even, indicates that an attempt was made to relieve the condition.

Quantitative Studies in Chemotherapy—The Oxidation of Arsphenamine.

VOEGTLIN and SMITH, in the *Journal of Pharmacology and Experimental Therapeutics* for October, 1920, state:

1. The sodium salts of the following arsenicals are relatively very stable toward atmospheric oxygen: arsenious acid, methyl and ethyl arsenious oxide, phenyl and diphenylarsenious oxide, *p*-amino phenylarsenious oxide.

2. Arsphenamine (dihydrochloride), contrary to the prevalent views, is exceedingly stable toward atmospheric oxygen.

The addition of alkali leads to a rapid increase in the rate of oxidation of the compound, the rate of oxidation being roughly inversely proportionate to the hydroxyl ion concentration.

3. The sodium salt of arsphenamine is first oxidized to the corresponding oxide, and this compound is simultaneously oxidized to the pentavalent arsenical.

The relative concentration of unchanged arsphenamine and oxide depends on the rate of reaction. The slower the reaction the more oxide is formed, but in every case the last portion to be oxidized consists of 50-per-cent arsphenamine and 50-per-cent oxide.

4. *M*-amino-*p*-oxyphenylarsenious oxide ("arsenoxide") is oxidized only in alkaline solution. The nature of the process curve indicates that the reaction is catalyzed by a reaction product.

5. Neoarsphenamine shows a rapid oxidation on exposure to air, amounting to about 50 per cent in the first ten minutes, after which the rate decreases rapidly.

6. The nature and rate of oxidation of arsphenamine and neoarsphenamine to the corresponding oxides furnish an explanation of the increase in toxicity and trypanocidal activity of these compounds, when their solutions are exposed to air.

The Influence of Saccharin on the Catalases of the Blood.

BECHT, in the *Journal of Pharmacology and Experimental Therapeutics* for October, 1920, writes on this subject and states:

1. Four grammes of saccharin per kilo of body weight does not increase the catalytic power of the blood of cats when the drug is injected into the gastrointestinal canal.

2. Wide variations in the catalytic power of the blood were noted in two dogs studied over a period of 73 to 91 days.

3. Daily variations in the catalase content of the blood are wide.

4. Saccharin in doses of 4 grammes per kilo acts as a powerful gastrointestinal irritant, producing in most cases vomiting and in many cases diarrhea. The changes in the catalase content were within the limits of normal variation. The drug has no specific action in increasing the catalase content of the blood. Smaller doses show less gastrointestinal irritation but no effect on the catalase content of the blood.

5. Saccharin intravenously produced in practically every case a marked decrease in the catalase content of the blood.

6. Saccharin present in amounts varying between 4 and 0.5 per cent decreases the catalytic power of the blood *in vitro*. Thus the reduction in the catalytic power of the blood in animals injected intravenously with saccharin is probably due to the direct action of the drug upon the cells of the blood.

7. Since the red corpuscles and the content of catalase varied in the same direction and proportionately in experiments where changes were noted, in all probability the mechanism of action of saccharin is mainly by alteration of the number of red cells per unit volume of the blood.

8. Removal of the pancreas has no specific influence upon the catalase content of the blood.

9. The action of saccharin is the same in the animal with pancreatic diabetes as in the normal animal.

10. An increase was observed in the catalytic power of the blood in 80 per cent of observations of patients with diabetes mellitus. Since the dose was so small and since the averages of all the changes were so small, about 2 per cent, and since there were relatively few cases, it is believed that this is of no significance.

Absorption from Serous Cavities.

CUNNINGHAM, in the *American Journal of Physiology* for October, 1920, states that his experiments do not settle the question of the feasibility of using the peritoneal cavity as a route for the administration of dextrose; but they furnish certain evidence which is of value, both in regard to its practical application and to the general reactions of the peritoneal mesothelium. The experimental results which are favorable for the use of this method are: the general effect upon the animals, the nature of the curve of absorption, the rapid recovery of the mesothelium, and the absence of adhesions. But the changes in the mesothelial cells cannot be considered as directly favorable, and may even prove a definite contraindication.

The animals he used suffered no ill effects as far as could be judged from their activity, general appearance, and weight. While the rats were not weighed every day, their weights were taken before the first injection, and occasionally thereafter; none were found to have lost weight, while several actually gained a little. It is evident that the length of time required for

the complete absorption of the dextrose solution was about the same in both series of animals; but the increase in fluid, soon after the injection, was considerably greater in the first than in the second. From these observations it is evident that the continued exposure of the surfaces of the peritoneum did not produce sufficient injury or change to decrease their ability to absorb this particular solution.

In addition to this conclusion these curves suggest the discussion of certain general features of absorption, concerning which we have very little conclusive evidence. Immediately after the injection of the sugar solution the total amount of fluid in the peritoneal cavity increases, and this can only be at the expense of the water in the tissues and blood stream. At the same time we may conclude that the sugar is passing out of the peritoneal cavity into the blood stream and tissue spaces, although this has not been established in these experiments by quantitative examination of the fluid.

In short an equilibrium is being established by osmosis and diffusion between the two systems: the sugar solution which has been introduced into the peritoneal cavity, and the contents of blood-vessels and tissue spaces. In considering the absorption of the solution after the equilibrium has been reached it seems evident that some other factor besides osmosis and diffusion must be involved. The most plausible explanation for this remarkable absorption, which takes place against the concentration gradient, seems to be that the sugar molecules are drawn over into the blood stream and tissue spaces by means of some difference in electrical potential; and this increase in concentration of the dextrose in the blood forces the water out of the peritoneal cavity. The evidence obtained from these experiments is insufficient to establish any hypothesis regarding the nature of this exchange.

The nature of the change in the mesothelium has not yet been established, and upon this depends whether or not the reaction of these cells can be considered as a definite contraindication to the administration of dextrose via the peritoneal cavity. If the change is fundamentally an injury; if the desquamating cells are badly injured or dying, and if those remaining are unable to recover the denuded areas, then adhesions are likely to form and inflammatory processes to develop, if any organism should obtain access to the peritoneum. On the other hand if the change in these cells is the result of stimulation, if the cells are actively proliferating, if those cells which do separate are viable and continue life as free macrophages, and if the remaining cells are capable of renewing the denuded spaces so that only a few cell areas will be empty at any time, then adhesions should not develop and the protection against adventitious infection would seem likely to be as great as ever. Theoretical possibilities must include combinations of stimulation and injury, in which case any application would depend upon the ratio between the two.

These questions are most difficult to settle experimentally; the evidence obtained from these experiments tends to support the suggestion that the changes are due to stimulation. The mesothelium, after exposure to repeated doses of a 10-per-cent solution of dextrose during a period of fourteen days, does not show denuded areas larger than the space normally occupied by two or three cells; there is no evidence of injury or death, but rather of active proliferation in these cells; no adhesions have occurred, and it has been shown that recovery, either by the return to normal of the cells which have rounded up or their replacement by other cells, is complete in six days.

The distribution of this change over diaphragm, spleen, and omentum, while the remainder of the peritoneal surfaces is comparatively normal, would indicate that there is some special differentiation of the mesothelium in these regions. And it is

quite possible that the explanation of the observed reaction should be sought in this differentiation rather than in some injurious effect produced on the cells by the dextrose.

A Method for the Prevention of Colic in the Nursing Infant.

CURRENT, in *Northwest Medicine* for October, 1920, states that during the past five years he has worked out and followed a method which, after constant application in cases of colic of varied severity, has proven very successful in preventing the colicky attacks. Knowing that colic is caused by decomposition of food in the bowel, it was conceived that, by administering a food vehicle which would be antagonistic to a decomposing intestinal medium and which would render an intestinal digestive flora less liable to decomposing changes, this trouble could be prevented in the greater number of instances. The method consists in the giving of from one-half to one ounce of 3 to 4.5 per cent of a warm cereal gruel immediately before each nursing, except the night nursing, and before each and every nursing if necessary. The results obtained have been excellent. This technique has been used in all cases of colic, and requires no alterations, except the amount of the starch mixture required for a certain infant, and the strength of the starch mixture according to the digestive ability and tolerance of a certain infant for a starch food. Very few infants of whatever age have any perceptible difficulty in digesting a 3-per-cent starch mixture. The reports of Sauer and of Porter on the starch feeding of infants are sufficiently convincing. There is no doubt that starch as a food is better borne and better tolerated by the infant than we have been not long since led to believe. By administering cereal gruel in cases of colic the decomposing culture-field is removed and a less favorable culture medium is established for the development of the intestinal bacteria.

That the diastatic and amylolytic ferments are present in the digestive tract of the greater percentage of infants of all ages has been proven by Moro, Hess, and others. Starch is, no doubt, well tolerated during infancy and there are no by-products formed to produce an intestinal toxemia. Oatmeal gruel, wheat gruel, and barley gruel are the different cereal gruels used. Oatmeal gruel is indicated where there is inactivity of the bowel, as it favors the formation of the volatile fatty acids, and for this reason gives a decidedly laxative action. Wheat gruel has very little effect upon peristalsis. Barley gruel has a quieting effect upon the peristaltic action and is indicated in instances where the bowel is overactive.

The Use of Water in the Diseases of Childhood.

In the *Boston Medical and Surgical Journal* of October 28, 1920, TALBOT states that in cases of summer diarrhea it is surprising to measure the total amount of water lost in the feces when six or more liquid stools are passed in the day. They may contain as much as one quart, the greater part of which is liquid. If the diarrhea is complicated by vomiting, it is easy to see why the body becomes so rapidly dried out and the patient appears so critically ill. The most important factor in treating such a case is to introduce sufficient liquid into the body to bring the body fluids up to their normal dilution. Parents often say that the child refuses to take water, but Talbot has never seen a case in which a child could not be induced to take the required amount of water in one way or another. He recalls one such case in which a trained nurse, on the third day of an infectious diarrhea, was able to get 91 ounces into a child by persistence and ingenuity. The clinical results were startling, and the child changed in twenty-four hours from one whose recovery was doubtful to one whose recovery was certain. Although this

is an extreme instance it is characteristic. In estimating how much liquid should be introduced into the body, the amount that is normally taken during health should be taken as a standard; to this should be added about 50 per cent more to compensate for what will be lost in the stools.

Fever also causes an increased loss of liquid from the body. This loss, however, is more difficult to estimate because it is usually lost through the lungs. If with the fever there is also restlessness, the loss of water may be very great. If there is also diarrhea, the loss will be excessive, and it will be found that twice the normal fluid intake will not be any too much to prevent the appearance of alarming symptoms.

In pneumonia the situation seems to be somewhat different because the distribution of water in the body apparently is abnormal. Although water may be retained in the body, it is bound to tissues which do not normally require it, and unless extra water is given there will not be enough circulating liquid to maintain the normal equilibrium of the body. In argument for this is the fact that following the crisis, in a case of pneumonia, there is remarkable increase in the water elimination via the kidneys and skin. It is therefore very important that additional water be given in cases of pneumonia, both to make up for the fever and to supply the tissues with the amount of water that they need.

In intestinal intoxication in infants, associated with acidosis, there is impaired elimination of liquid from the kidney. This may be ascribed either to the loss of water in the stools in such great amounts that it is impossible for the infant to ingest sufficient fluid to replace that loss, or to the fact that the patient refuses to ingest liquid or vomits practically all that is taken. As a result the tissues become dehydrated. This may be cured by introducing enough water into the body.

The best treatment is, of course, prevention of desiccation of the body. The methods of introducing water into the body depend upon the symptoms of the case under consideration. Even when there is no vomiting, and during the early stages of febrile diseases, a record of the amount of liquid ingested should always be recorded and added up at the end of each twenty-four hours. In this way only is it possible to know how much fluid the child is receiving. If this is taken into consideration early enough and the child is given the amount of liquid which would normally be ingested during health plus the estimated amount lost as a result of the disease, fewer untoward symptoms will appear. A study of the records of the liquid ingested is often highly interesting and the information thus obtained is very important. Sometimes it is necessary to force water when the child is not receiving enough. This should be done when necessary in all instances except when it is done at the expense of the child's strength or when it causes vomiting.

The second method of introducing water is by the rectum. Success with this method depends very much upon the means employed. Very little success can be expected during diarrhea when there is excessive peristalsis, but it should always be tried. In other conditions without diarrhea, water may be introduced once in four hours very slowly, taking half an hour to introduce three to eight ounces, according to the age of the child, or it may be administered by the Murphy drip, four to five drops per minute, for periods of three hours. This should be alternated with rest periods of three hours in order that the rectum will not become irritated and peristalsis started up.

Finally water may be introduced subcutaneously or intravenously. In most instances subcutaneous injection of water is sufficient, but occasionally when very rapid results are essential it is necessary to introduce it intravenously or intraperitoneally. The water should be absolutely sterile and should be isotonic with the blood—that is, a normal saline solution. From three to sixteen ounces may be introduced at one

time into desiccated children. It is surprising to see how quickly they react to this form of medication. When there is any desiccation of the body the results are practically always quick, and like those of a very strong stimulant.

Errors in the Diagnosis and Treatment of Myocardial Insufficiency.

GREENE, in the *Canadian Medical Association Journal* for September, 1920, states that the points which he deems fundamental may be summarized thus:

1. The harmful effect of the traditional optimism on the one hand and pessimism on the other with respect to the course of established cardiovascular disease and the after-lifetime of the cardiopath.

2. A faulty method of approach which leads one initially to seek to establish the abnormal rather than to prove the existence of the normal.

3 and 4. The tendency to undervalue systolic or postsystolic apical non-structural bruits, and, on the other hand, to focus attention upon the valvular lesions rather than the condition of the heart muscle, which is basic in all cases, together with a lack of understanding of the vital importance of tonicity and the readiness and frequency with which it is impaired, and a failure to appreciate the large proportion of deficient hearts which though diseased are not the seat of valvular disease or of frankly expressed myocardial inflammation or degeneration and are wholly or relatively silent.

5. A failure to recognize fully the fact that the heart invariably is affected in acute infections of an exhausting type and in major surgical operations, the chief source of weakness associated with these conditions being the myocardium; and that in consequence it becomes necessary not only to watch the heart with great care under such conditions, but also to insist upon longer convalescent periods than are at present allowed, and wherever possible investigate the heart condition from time to time during a considerable period thereafter.

6. The fact that in all probability nine-tenths of the cases of abnormal enlargement of the heart, whether due to dilatation, hypertrophy, or both, under present clinical methods remain wholly unrecognized.

7. Certain fundamental factors of error exist, embracing the almost universal employment of a false normal for the transverse cardiac diameter, and a failure to appreciate the extreme variations which may exist owing to fundamental differences in the type of bodily structure. To this may be added the continued general employment of landmarks almost wholly undependable.

8. The wide employment of the flat-finger method of percussion which cannot yield accurate results either with respect to the right or the left border of the heart in a large proportion of the cases.

9. An unfortunate tendency to underestimate not only the actuality but the frequency of a readily produced cardiac overstrain not infrequently associated with lesser grades of dilatation.

10. A general failure to recognize the subjective symptoms of persisting myocardial inadequacy and reserve impairment such as constitute a most important factor of the evidences of this condition when existing in its minor but vital degrees.

11. A failure to recognize the extreme value of rest, absolute or relative, as indicated, and the administration of adequate doses of digitalis as a diagnostic measure.

12. The as yet but imperfectly recognized importance of a type of individuals embracing a considerable proportion of the population who are from birth actually or potentially inadequate, structurally and functionally, and in various degrees unable to meet excessive or even moderate stress or strain in life and living.

The treatment of cardiovascular disease at present is in general inefficient, unsystematic, desultory, halting, and fatally belated, whereas it should be early, timely,

efficient, rational, systematic, and sufficiently prolonged in appropriate cases to secure for the cardiopath the highest possible degree of disease retardation and myocardial rehabilitation.

Finally, as Greene has stated many times, the failure to apply to the cardiopath the same wise procedure with respect to diagnostic and therapeutic initiative, timeliness, accuracy, and systematic thoroughness, together with opportunities for institutional care, which now is granted the victim of tuberculosis after centuries of like neglect is wholly unpardonable.

Surgical and Genito-Urinary Therapeutics

The Intensive Administration of Arsphenamine.

GOODMAN *(New York Medical Journal,* Oct. 2, 1920) reports on intensive therapy in 80 hospitalized syphilitic negro patients. The cases were divided among the syphilitic periods as follows: 28 primary cases; 23 cases of silent generalization; sixteen cases of secondary; latent tertiary, four cases; active tertiary, nine cases. At least half the patients presented the initial lesion on or near the frenum. Goodman expresses the opinion that practically every lesion at the frenum harbors the Spirochæta pallida. A fairly common type of initial lesion was one at the meatus. Goodman means by silent generalization patients who present chancres with no secondary lesion of the skin or mucous membrane and a four plus positive. He states that he has seen instances of the destruction of the entire glans penis in which the patients had no prior treatment. Many of the patients were self-treated. One patient, with no symptom or sign other than four plus Wassermann, was admitted for bed wetting; he was unimproved by treatment.

The plan of treatment was on lines laid down by Pollitzer, which Goodman terms the intensive method in distinction to the intermittent method. The intensive method consists of the daily administration intravenously of arsphenamine for three doses. Each dose consists of four decigrammes dissolved in fifty cubic centimeters of freshly distilled and boiled water, and then alkalinized to comparative neutrality with fifteen-per-cent sodium hydroxide. This mode of treatment is a desirable variant of the *therapia sterilisans magna* of Ehrlich.

The theoretical reason for the failure of this method was that the single dose killed a large number of spirochetes, but that some few escaped, and later by multiplication were nearly as numerous as before, sensitized to arsenic and more dangerous. Another reason was that the excretion of the arsphenamine was begun almost as soon as injected, and that in the first few hours most of the drug was out of the body.

Since arsphenamine is essentially thirty per cent arsenic, it appears that, injected intravenously, ninety per cent is excreted by the kidneys in the first three days. The intensive method counteracts both of these undesirable features because the concentration of the arsenic product in the blood is kept at an efficient high level. Following the intravenous medication, mercury salicylate in grain doses was given once each week.

The negro is a bad subject for mercurial therapy because of the ease with which even small doses cause stomatitis. This occurs despite the care that the patients take of their teeth and gums. They used tooth-brushes twice daily and the mouth-wash after each meal.

On odd occasions a patient would vomit after partaking of the light repast provided six hours after receiving the injection. This did not contraindicate further use of the drug, but the patient went without his luncheon thereafter. The greater number of

the patients received arsenobenzol (Schamberg), which gives remarkably few reactions of any kind.

Eighty hospitalized syphilitic negro men were given the intensive arsphenamine treatment as suggested by Pollitzer. The clinical results were immediate in all uncomplicated syphilitic manifestations. The infectiousness of the patient was reduced thereby much quicker than with the same amount of the arsphenamine introduced intravenously by the so-called intermittent method. The changes in serology were most encouraging, but no attempt was made to base conclusions.

The public health value of this method of therapy should be emphasized since the period of hospitalization of infectious syphilitic persons is much reduced. This is an important consideration in the prophylaxis of syphilis by treatment.

Fatal Postarsphenamine Jaundice.

HYMEN (*New York Medical Journal*, Oct. 2, 1920) refers to the paper of Lynch and Hoge on four fatalities. He states that in a review of several thousand doses of arsphenamine given at the Venereal Clinic of the Long Island Hospital he has been able to demonstrate seven cases of toxic jaundice no doubt due to this specific drug. All of these patients recovered. The fatality was produced by a single dose of arsphenamine. A strong woman, weighing 170 pounds, presenting gonococcal infection and treated because of a history of miscarriages and a positive Wassermann, was given 0.4 gramme of arsphenamine intravenously, followed promptly by nausea and vertigo; thereafter no symptoms until the fifth day. The patient then experienced a general lassitude, urine and blood examination negative. For the next two weeks the patient continued to grow weaker without any other signs developing. One month after receiving the arsphenamine she became slightly jaundiced. Thereafter developed pain in the right thigh; some purpuric spots developed over the painful area, others later over various parts of the body, and jaundice increased in severity, the stool containing bile. Vomiting came on, bleeding from the nose, and finally semidelirium and death. Post-mortem examination showed hemorrhagic phenomena in one or more of the viscera; the kidneys exhibited a type of tubular nephritis much like that seen in mercurial poisoning. The liver was slightly large and purplish-red in color. The cut surfaces presented an essentially normal appearance. In all the cases reported the patients were given both arsenic and mercury.

Tuberculosis of the Hip.

STEWART (*Journal of the Missouri State Medical Association*, September, 1920) bases his study on 74 cases, most of them developing before the age of eight. The effect of trauma is difficult to determine.

Of the various symptoms and physical signs usually ascribed to tuberculosis of the hip by text-books on orthopedic surgery, persistent limp and muscle spasm on attempted passive motion of the hip are the constant ones and are the cardinal signs. They are the first to appear and the last to leave and, demonstrated in a child, are enough to warrant confinement to bed until a careful study has eliminated tuberculosis of the hip. Night cry was a fairly constant symptom in the series, but pain when awake, except on sudden motion of the joint, was not common in the early cases. Evening elevation of temperature, night sweats, loss of weight, and symptoms commonly associated with tuberculosis, did not appear in a majority of early cases. Deformity, most apparent with the patient lying supine, was present in most of the cases and was represented by various degrees of flexion, usually accompanied by some abduction or adduction. Muscle atrophy is due to disuse and does not become conspicuous until motion has been restricted for some time. Measured shortening is not found until some deformity of the head or neck has taken place. None of these signs, except limp and muscle spasm, appear con-

stantly and are not at all necessary in arriving at a diagnosis.

A positive diagnosis of tuberculosis of the hip cannot be made except by the examination of material from the involved area. A diagnosis conclusive enough to warrant rational treatment as such can be made, however, from the careful study of the case, preferably in a hospital where Roentgen ray and laboratory facilities are at hand and a record of the patient's symptoms, night and day, can be accurately kept.

The examination of every patient complaining of suspicious symptoms should include examination of the gait, if walking, attitude while lying, movement and restriction of movement of the hip and adjacent joints, the examination made with the child stripped of all clothing. The patients themselves often complain that their pain on motion is confined to the knee-joint. Muscle spasm will guard the motion of the affected joint and will give the positive clue in these cases. Disease of the lower lumbar vertebræ and sacroiliac joints is not easily differentiated. Involvement of these areas will often give pain referred to the hip-joint, and irritation of the psoas muscle supplies the deformity and restriction of motion. Abduction and external rotation, however, are usually not restricted in vertebral tuberculosis, while if the disease is in the hip-joint these motions are prominently limited. One of Stewart's cases of vertebral tuberculosis so definitely simulated hip disease that he was treated by leg traction for several weeks in spite of negative Roentgen rays until a slight prominence in the lower lumbar region caused Roentgen rays to be taken which showed beginning destruction of the fourth lumbar vertebra. Even at this time restriction of motion of the spine was not marked. Syphilis affecting the hip may give the cardinal signs of tuberculosis, and the Roentgen ray may show destruction of the head of the femur which cannot be definitely said to be one or the other. The positive Wassermann should make the diagnosis of syphilis fairly conclusive, but it must be remembered that it is possible for a child with syphilis to have tuberculosis of the hip, and such a case should be treated with fixation until the lesion responds to syphilitic treatment.

Perthes' disease, while it gives the cardinal signs of tuberculosis of the hip, shows in the Roentgen ray as a flattening of the head of the femur without the irregular outline of actual bone destruction. These cases should be observed frequently and carefully, and in the opinion of the writer should be treated as tuberculosis until tuberculosis is positively ruled out or the early disappearance of the symptoms makes the diagnosis of Perthes' disease the more probable one.

The prognosis should never be too sanguine. Under the most careful rational treatment the course is long and tedious, and frequently there are setbacks discouraging to both doctor and parents. The parents should be made to understand thoroughly the seriousness of the condition when treatment is begun, and at the same time should be assured that it is by no means hopeless, and that by infinite care and attention to the details of treatment the patient may obtain a good functioning joint without deformity. The possibility of abscess formation should be mentioned, and occasional unpreventable metastasis to the meninges and lungs. Seen early and under the most favorable circumstances for treatment the minimum time for treatment with apparatus should be put at two years, but the great majority of cases will require much longer time.

In the hospital they are immediately placed on a Bradford frame and enough traction exerted on the leg to overcome muscle spasm. In cases with deformity, traction is started in the line of deformity and the line gradually changed until the desired position is obtained. When deformity has been overcome and acute symptoms have disappeared, an ambulatory splint is applied and the patient is allowed to be on crutches for an increasing period of time each day. The type of splint used depends largely on the care the patient is liable to receive after leaving the hospital. If con-

ditions at home are considered such that the patient is liable not to receive much care and attention, a plaster-of-Paris spica is applied from the costal margin down to and including the foot, and an extension sole is placed on the unaffected side.

After leaving the hospital these patients are seen in the clinic once a week, the condition of the brace or cast noted, and any desired changes made. Muscle spasm is gently tested, but frequent attempts to ascertain the amount of motion in the joints are strictly avoided. If an abscess appears superficially the patient is once more placed on a frame with traction, and if it shows any tendency to undermine other tissues it is incised, and pocketing is freely opened, pus is evacuated, and the wound closed without drainage.

When cases wearing apparatus have improved to such an extent that no muscle spasm or pain on motion can be demonstrated, they are fitted with what is termed a convalescent splint which is attached to the shoe and places most of the body weight on the tuberosity of the ischium instead of the hip-joint. Crutches and extension sole are then discarded and the patient is allowed to walk. After this has been worn several months without symptoms, it is left off for increasing periods of time so that normal weight-bearing is practiced gradually.

Twenty-eight of the cases were located for an examination of their condition at the present time, and the results in the cases examined were gratifying. Eighteen cases had no active symptoms—that is, no muscle spasm or pain on motion. Of these quiescent cases two had apparently firm ankylosis in good position, and the remaining sixteen had motion varying from a few degrees to almost normal. Of this number thirteen had been without apparatus of any sort for more than six months, and five were still wearing convalescent braces. Eleven cases had from 1 to 2.5 inches shortening, while seven had less than 1 inch. The records showed that four cases had died of tuberculosis.

Gastric and Duodenal Ulcers.

McCLURE and REYNOLDS (*Boston Medical and Surgical Journal,* Sept. 9, 1920) summarize extensive hospital records as follows:

The symptomatology of peptic ulcer may be typical or atypical. The typical type, by aid of the radiographic findings, may be diagnosed with a high degree of accuracy. In the diagnosis of the atypical class *x*-ray studies are of the utmost value; in many cases the diagnosis cannot be made without them.

X-ray studies should form a part of the physical examination of every gastrointestinal case. Their importance in the diagnosis of peptic ulcer is second only to that of the history of the case.

X-ray studies are the most efficient and accurate aids in the differentiation between functional and organic pyloric obstruction, and between ulcer and cancer.

In the great majority of cases laboratory findings are of less value as an aid in the diagnosis of peptic ulcer than those obtained from radiographic studies.

The laboratory findings valuable in diagnosis are gross amount of blood in the vomitus or gastric contents, the frequent vomiting of old food residues, and tarry stools. Findings of less value are the persistent presence of occult blood in the stools, the presence of food residue in the gastric contents, and the presence of free HCl in the gastric contents.

The Results of Induced Pneumothorax in the Treatment of Pulmonary Tuberculosis.

SAUGMAN *(Lancet,* Oct. 2, 1920), on the basis of twelve years' experience with 430 patients who were subjected to about 10,000 punctures, believes that the method is of distinct value. After two cases of sudden death occurring in 1912 there have been no accidents in a series of 272 cases, so the mortality of the operation has sunk to below one-half per cent. The two fatal cases were probably due to gas embolism, although it could not be proved by examina-

tion. With the present cautious technique there are no dangerous complications from the injection of gas.

After the elimination of a certain number of cases not suited for a comparison which the author wishes to make, he considers 257 patients belonging to the third stage and all showing tubercle bacilli in the sputum. In 172 cases he succeeded in forming a pneumothorax, although not always a large one; these he calls effective cases. In 85 cases an efficient pneumothorax could not be formed; these he calls the ineffective cases. The number of those who in 1919, *i.e.*, 2 to 11½ years after discharge, could be classed as able to do general or light work in the "effective" cases is more than three times as great as in the "ineffective" cases, while the mortality is only about two-thirds as great. In cases of complete pneumothorax without notable adhesions the percentage of capacity for work after 3 to 13 years was about 70; in cases of incomplete pneumothorax it was about 11.

The author states that he knows of no other treatment which gives third-stage, sputum-positive cases a 33-per-cent chance of being able to work after seven years. He thinks it is a somewhat dangerous thing to cease treatment before the lapse of one year. When peculiar circumstances favor it in very recent cases, when the lung is not fibrous, when the pneumothorax is complete it will perhaps be sufficient to continue the treatment for only one year; but usually at least two years' compression will be preferable. Chronic cases should be continued for two or four years. Even after four years relapses are not impossible. The cessation of pneumothorax is always in a measure a risk. It will usually be sufficient where the treatment has lasted for some years to inject gas every second or third month.

A patient who during several years has been treated with a pneumothorax with good results feels, apart from a little dyspnea, quite well and is able to work like a healthy man, unless hard physical exertion is required. For instance, a busy medical practitioner has continued his work for five years without trouble, although he had to cycle during last winter's epidemic of influenza when benzene was scarce. The only real risk such a patient runs is that of pneumonia in the other lung. The writer has had one such case; the patient was a young medical man, who had been treated during six years for a practically hopeless condition, but had been able to finish his studies and do his hospital work. Perhaps he might have been saved if he had allowed the gas to be withdrawn from his pneumothorax, which he, being overcautious, had kept superfluously large; but there was no chance of performing such an evacuation. The post-mortem examination in this case showed complete healing of the lung; there was a cavity completely compressed. Examination of a series of slides of its walls showed one single giant cell; but bacilli could not be found, and inoculation of a guinea-pig gave a negative result. This man could, no doubt, have let his lung reexpand long ago; at any rate, it would have been sufficient to maintain a very small pneumothorax, which would have allowed the "sick" lung to work again, while a thin space of air would have been kept up with a view to an enlargement should this be necessary.

In the case of incomplete but efficient compression it will usually be right to continue the pneumothorax treatment for good, unless the treatment is abandoned in favor of a total or partial thoracoplasty, which will in many cases be preferable.

Of alternating compression, first of one then of the other lung, the author has had 7 cases—two patients, discharged in 1918, being included. They all died except one, who first had his left lung compressed for eight months, with cessation in July, 1913, and in whose right side a pneumothorax was formed in January, 1914, which lasted sixteen months. Since 1915 he has been quite well and able to work. Though such an alternating treatment in most cases will be without result, it is seen that in single cases it can be of use, and we therefore are justified in employing it, especially when

there is a rather long interval between the cessation of the first and the beginning of the second treatment.

An effusion in the pneumothorax cavity is one of the most frequent complications; of 143 patients, 79 had an effusion in the sanatorium (31 large, 23 middle-sized, and 25 small); in four cases an effusion was found at the induction of the pneumothorax.

It is astonishing that the results in effusion cases were entirely comparable with those treated by artificial pneumothorax. Still more astonishing that many of the patients now completely fit for work have passed through severe suppurative pleurisies with tubercle bacilli in the pus, and persisting for several years.

A surgical colleague remarked a couple of years ago that he hoped to become old enough to see the burial of pneumothorax treatment. He did not live long enough, however, and though he had lived ever so many years he would not have seen it. The pneumothorax treatment has got a permanent place as an important remedy in our therapeutic armory, a place that only ignorance of the methods and its results can deny. It is not unjustly that Holmgren in his chapter in the Scandinavian Text-book of Medicine characterizes it as the greatest progress made in the treatment of phthisis since Brehmer's and Dettweiler's time.

A New Treatment of Cancer.

KOCH (*Medical Record*, Oct. 30, 1920) after discussion of the accepted theory of thrombokinase, treated cancer patients with tissue thrombokinase and with tissue thrombin, amounts varying from 1/100 grm. to 1/2 grm. being injected subcutaneously, generally in the patient's buttocks, the substance being dissolved or suspended in normal salt solution in quantity from 1 to 10 Cc.

Quantities of the kinase insufficient to cause extensive intravascular coagulation of the blood, and therefore immediate death in the patient, were found actually to increase cancer growth and, moreover, to cause so great a negative coagulation phase of the patient's blood that hemorrhages were profuse and the continuance of such treatment threatened the patient's life. The site of the injection showed tissue death. Therefore such therapy was discontinued as useless and harmful.

The use of the tissue thrombin, however, brought very different results. Locally, where injected in the hip, no sign of disturbance was produced—no more than if normal salt solution were injected.

There was no change in the patient's blood coagulation time. The microphotographs show the effect of the injected tissue thrombin upon cancer cells. These sections were taken from a large squamous-cell carcinoma of the neck. The most pronounced changes are, first, a disappearance of the cells lining the basement membrane. These are the cells closest to the blood supply, the germinal cells of the cancer. Naturally the tissue thrombin reaches them first and they are the first to be destroyed. As rapidly as they disappear angioblastic tissue replaces them. Apparently the carcinomatous clumps are being devoured by angioblastic tissue just as takes place in the development of bone and in the organization of a blood-clot. Investigation of the chemistry of these three phenomena reveals that they are essentially the same process. The changes preparatory to organization of the cancer tissue are nucleolysis and a fibrin formation in the cells, and a swelling of this fibrin which produces a hyalinization of the cancer protoplasm. This is a digestive change in the clotted protoplasm which accompanies the ingrowth of the angioblastic tissue.

The clinical features that accompany this change induced in the cancer are for the first twenty hours after injection practically negligible. There is no change in the heart-beat, in the respiration, or in the comfort of the patient. Locally, in the hip where the injection is given, there is no reaction at all. After twenty-four hours the injected material has been taken up by the circulation and lodged in the cancerous tissues, where it now shows its work. The

cancerous parts become swollen, more painful than usual, and reflexes associated with the part are augmented and fever develops, especially between twenty-four and thirty hours after injection, generally lasting from two to six hours, and as this subsides the affected parts become smaller and less tender than before treatment, and there is less pain. The patient, however, may be quite tired out the next day, but the following day finds him more normal and buoyant. As a rule, after two injections hemorrhages have stopped, not to return, and pain likewise, as treatment proceeds, rapidly passes away.

Nine case histories are presented in full. Every carcinoma case, generally twenty-four hours after treatment, developed a febrile reaction, accompanied by increased focal pain. Moreover, a systemic intoxication as expressed in a grippy feeling accompanied the reaction. These phenomena were no doubt due to the swellings of the coagulated tissue and to oxidation of the absorbed products. The focal reaction is of value in determining the distribution of the cancer tissue. For instance, those cases of breast cancer with pulmonary involvement developed dyspnea and dry cough during the reaction.

The author cites the case of a patient weighing 170 pounds, with marked bilateral pulmonary involvement, as shown by the *x*-ray and dilatation of the heart, especially on the right side. In the right breast was a hard mass 9 cm. long and irregularly 4 cm. thick. The skin was movable about it. In the left axilla were a mass as large as a lemon and also several smaller masses. The left breast had been removed two years previously; the scar remaining appeared healthy.

This patient suffered quite severe dyspnea, the respiration running generally around 38, while the heart-rate was variably 140. She was very cyanotic and the slightest exertion brought on intense dyspnea. Cough was incessant. The patient could not repeat more than two letters of the alphabet without taking breath. She was given six treatments, of 10 mg. each, weekly. The improvement in respiration was so marked that she could get up and walk about, only breathing twenty-eight times per minute. In the meantime the mass in the right breast disappeared, and the mass in the left axilla had diminished in size to that of a walnut. During the reaction periods she required constant stimulation, and even then the cough and dyspnea were almost unbearable. Her reaction temperature varied between 101° and 102°. After having improved so markedly, Koch risked a treatment of 50 mg., which proved to be too much for the patient, and she died in a reaction of cardiac failure. There was sufficient cancer left in the lungs, no doubt sufficiently swollen during the reaction, to obstruct the pulmonary circulation and cause failure of the right ventricle. An autopsy was not obtainable.

This illustrates that in very extreme cases the focal reaction also may be dangerous and that here the dosage must be guarded.

The gastric ulcer case showed no febrile reaction. We, therefore, now possess an additional means of recognizing cancer by the febrile reaction elicited by this treatment, and since this is incident to the chemical and physiological properties of the cancer tissue, it depends upon the intrinsic essential structure of the cancer and is therefore more valuable as a diagnostic feature than the microscopic characteristics. Furthermore, a good thermometer is the only instrument needed to estimate the fever, and the personal equation for error cannot be so great as that to which the pathologist is subject.

The treatment, as illustrated by the cases presented, shows a disappearance of the tumor and its attendant cachexia, return to normal of the blood chemistry—the alkalinity, for example; increases in the blood count and hemoglobin content—a doubling of the blood count in four weeks, for instance; increase in weight to normal or above normal, as in one case—often an increase of 40 pounds; complete disappearance of pain and soreness and return of function, as in one case in which a

previous achlorhydria gave place to a 0.9-per-cent HCl content in the gastric juice, incident, of course, to the return of the blood alkalinity to normal. The rapid recuperation of the patient after the carcinoma has disappeared, and the loss of easy fatigability, as demonstrated by these cases, are also significant.

The sequelæ are also physiological. In a region as the breast of Mrs. P. a deficiency exists in place of the cancer tissue. In a region where there is a necessity for replacement of the cancerous area by scar tissue this takes place, as in the case of Mrs. B., where a large vesicovaginal fistula was entirely replaced by scar tissue and the deficiency made good.

That the issue thrombin itself is not injurious to the patient is illustrated in the cases presented by failure to obtain a reaction after the cancer tissue has disappeared, by the steady gain in weight during treatment, and by the increase in the blood count and in the hemoglobin content during and after treatment, and by the normal non-coagulable nitrogen content of the blood after treatment, which indicates that no injury has been done to the kidney.

The Spinal Sign in Gastric Crises.

BROWNING (*Medical Record*, Oct. 30, 1920) observes that of the various crises and episodes that occur in the course of tabes the gastric form is accounted the most frequent. And all the severer seizures of this kind are so distressingly exhausting, and sometimes even dangerous, as to demand careful attention. The suddenness of onset and urgent character of these attacks do not favor careful observation. At least the customary descriptions mention little more than the emesis, prostration, and pain.

There is one sign in connection with these attacks that has either never been noted or has not found general recognition. If observed at all it has doubtless been passed over as too insignificant for mention, but for many years the writer has found it useful as a diagnostic aid, and of recent years also as a therapeutic indication.

It is a relatively easy matter to elicit the sign, and it can be briefly described. It consists of a point or small area of tenderness just to the left of the spinal column, corresponding to the fifth dorsal interspace or one at about that level. It is always to be found on the same side as the stomach. It may extend to more than one space, though usually most marked at a definite level. It rarely involves the other side, and then only in minor degree.

The location relative to the spinal column is similar to that in so-called spinal irritation; but is distinguished by its unilateral character. A couple of slow searching strokes along the side of the spinal column by the tips of the thumbs or even of the fingers soon settles the question. An evident wince on the part of the patient or an expression of pain shows when the tender spot is reached.

Because a tabetic has a little nausea or gastralgia is not full proof of a crisis. In typical cases of this kind the sign appears to be regularly present for a time at least. Whether it precedes the onset of a crisis cannot be stated, but it has always been found as soon as a crisis case was examined.

Within a few days of the subsidence of the vomiting and concomitant distress this point of special tenderness rather rapidly subsides. And even toward the end of a prolonged attack the tenderness may become less marked. It is the more in evidence as the tabetic is often relatively analgesic.

It is relevant to ask what is the point of origin of gastric crises? Although the systemic or luetic condition is the underlying etiologic factor, the immediate cause is more likely some intermediary process.

Whether the vomiting is of central origin, cerebral in type, a view largely held by Germans, or is due (Mills and others) to disease of the vagus, or is analogous to the pain and other crises of tabes and hence perhaps radicular in origin, does not seem to be determined.

Pain, anorexia, and distress may terrorize the patient. Many have been subjected to operations in good part unnecessary. Occasionally prostration suggestive of a moribund state lasts for days, with but gradual recovery. Together then such cases make a record of suffering so severe and often recurrent as to warrant common sympathy and emphasize the need of something better than haphazard therapy.

The almost invariable way is to have prompt recourse to morphine or its congeners. But while this may numb the pain it greatly aggravates the nausea, upsets the digestion still more, and tends to prolong the attack. These patients also but too easily acquire a habit for such drugs. Some plan consequently is demanded that if possible does away with the use of opiates and anyway reduces their use to a minimum.

In fact Ostnakow (in Russian 1906; v. *Neurlgo. Centbl.*, 1909, pp. 14-17), after stating that the immediate cause of these crises has not been worked out, recognizes a toxic origin, and gives good reasons for attributing the development of gastric crises, in large part and sometimes wholly, to the use of morphine or other sedative.

As comparable crises have been reported in Graves's disease, in syringomyelia, and perhaps in other conditions, it is possible that the present plan is not then as applicable. In the tabetic form there are two general lines of attack that have proved useful.

In the first place the irritation, presumably at the nerve root of the ganglion, needs consideration. For even if the tenderness be but a sequel, some direct connection is evident, and a reverse influence is quite possible. Some form of counter-irritation locally over the tender spot can be readily applied. For this doubtless any one of various favorite methods can be adapted to good purpose. The writer happens to be in the habit, for this particular purpose, of having blue ointment, or else the 25-per-cent oleate of mercury, rubbed in along the region of the tender spot. A half-drachm or less suffices, and this can be repeated once a day as required.

It may be in part the massage and in part the mild skin irritation, or some absorptive effect, or some remoter action that does the most good. It is at least a rational method, and seems to be of material aid in limiting the crisis.

In other painful attacks in tabetics it is sometimes possible to find a tender point corresponding apparently to the exit of the respective nerve from the spinal column. In such cases also a similar plan over the tender spot beside the spine can be profitably adopted.

Where the pain is severe or an immediate impression is imperative, recourse can be had to the therapeutic *x*-ray locally at the region of the sensitive root. This has long been used in a similar way for other tabetic pains. Otherwise, as far as practicable, it is well to begin treatment with counter-irritation, and follow with the *x*-ray if necessary.

Lumbago as Related to Railroad Injuries.

LILE (*International Journal of Surgery*, October, 1920) contributes a paper on this subject, observing that apparently the causes have been as numerous as the cases, so that he thinks the actual cause cannot be defined. Suffice it to say that from stubbing the toe to lifting or straining to lift heavy weights, stooping to pick up something or to tie a shoe, each has its quota of cases of lumbago following. But its definition could not be well improved on if called a "Hell of a spasmodic pain in the lumbar region."

It should always be differentiated from direct traumatism, renal colic, acute nephritis, perinephritic abscess, uterine disease, caries of the spine, ileosacral subluxation, lumbar neuralgia, arthritis, and tuberculosis of the spine.

Lumbago occurs much more frequently in men than in women. Its duration varies from several days to several months.

First, rest in bed, a good purgative, preferably a mercurial, some of the non-opiate-containing drugs for pain, and lastly,

strapping the back with adhesive plaster. This plaster must be put on taut. The author's plan is to begin about the midaxillary line on one side, pull taut diagonally downward across the back to just about the middle or lower part of the glutei muscles, cross this from the opposite side, then another and another layer until the back is firmly strapped. This will hold all the muscles of the back and prevent the spasms from recurring. He has found this latter method the most effectual in treating lumbar backache, no matter what the cause.

It is not unusual to find that sciatica—the worst pain to which the human race is heir—follows these attacks of lumbago.

Strapping the back as above mentioned is the most efficient treatment even if the cause be "Spanish flu."

Two Strains of the Treponema Pallidum.

The *Pennsylvania Medical Journal* for October, 1920, notes that Levaditi and Marie have apparently proven that there are two strains of the treponema pallidum, the more common in occurrence producing typical Hunterian chancre, the wide-spread secondaries, and in the tertiary stage invade the viscera and bones. This is named the "dermatrophic virus." The other strain of organisms produces atypical chancres, leads to unimportant secondaries, and quickly involves the central nervous system. This is termed the "neuratrophic virus."

"The facts adduced in the memoir show that between the treponema of ordinary syphilis and the spirochetæ of the postsyphilitic, cerebral, and spinal lesions, such as are obtained from the blood (and probably also from the brain), there are striking differences, as well from the biological point of view as from the point of view of the lesions that they occasion in men and animals. These differences persist, in spite of a considerable number of passages through the rabbit, and may be summarized thus:

"In the duration of the period of incubation, which is a great deal longer in the case of the neuratrophic virus.

"In the character of the manifestations produced in the rabbit: an indurated chancre in the case of the dermatrophic virus, papulosquamous lesions in the case of the neuratrophic virus.

"By the microscopic peculiarities of the lesions: a marked affinity for the epithelial tissues on the part of the neuratrophic virus, vascular and sclerotic alterations being a great deal more marked in the dermatrophic virus.

"By the evolution of papulosquamous lesions through the increase and dissemination of the spirochetæ of general paralysis in the rabbit; slow evolution, late spontaneous healing, reappearance after a period sometimes very long.

"By the pathogenic power of the organism: marked virulence for the lower monkeys, anthropoid apes and man on the part of the dermatrophic virus; no pathogenesis through cutaneous inoculation of the spirochetæ of general paresis.

"Lastly, by the fact that animals healed of the lesions provoked by one of the treponemas, and which through this fact have acquired a refractory state as regards that treponema, continue, in the generality of cases, to be receptive for the other spirochetæ."

It is interesting to note in closing this summary of the investigation that the virulence of the dermatrophic virus is entirely unmodified for monkeys, anthropoid apes and man by passage through rabbits, while that of the neuratrophic virus is entirely destroyed.

Through a laboratory accident on the one hand, and a voluntary sacrifice on the other, they were able to add the effects of the viruses upon human beings to their experimental investigations upon the lower animals. Thus, "a person among those participating in the investigation accidentally infected himself by a needle prick, with the juice expressed from a chancre on a rabbit, and containing a great number of mobile treponema. The inoculation was on the back of the hand and took place January 7. On January 20, thirteen days afterward, the blood was Wassermann negative. There

was no lesion until January 31, when a slightly erythematous nodule was noted, becoming distinctly papulous by February 7—thirty days after the accident. The papule indurated slightly and became covered with scales in the center. Wassermann negative. No enlarged glands, no secondaries. The lesion preserved the same general appearance until the 10th of March, when it paled. The Wassermann reaction, which was negative on February 24, became positive on March 10. The lesion was shown to be rich in treponemas. It healed completely March 24. The case was followed for six months. No secondaries. The Wassermann remained positive (last observation June 16).

This showed that the dermatrophic virus remained virulent for man even after having been kept growing in rabbits from 1908 to 1914. Now compare this with the other human observation made with the neuratrophic virus, which experiments upon lower animals showed to lose its virulence: "X., never having had syphilis and showing negative Wassermann reaction, was inoculated by scarification on the right arm with a juice rich in treponemas taken from a rabbit inoculated for the first time with fresh human virus. There was no reaction, either general or local, during long months of observation, and the Wassermann reaction remained negative after five years."

Extrapleural Thoracoplasty in the Treatment of Pulmonary Tuberculosis.

BULL (*Lancet*, Oct. 16, 1920) observes that the object of extrapleural thoracoplasty is to produce collapse of the lung. Of the various methods employed for that purpose, the best is that which combines the least risk to the patient's life and future capacity for work, with the greatest likelihood of a sufficient falling-in of the wall of the chest and resultant retraction of the lung tissue, at the same time putting the lung more or less out of action. Those surgeons who have specially occupied themselves with this branch of surgery—viz., Friedrich, Brauer, Sauerbruch, and Wilms—have more and more closely approached each other's methods, and apart from the question of priority there is now a practical unanimity in the main features of the method, the greatest stress being laid upon the removal of the posterior section of the rib. This idea constantly appears in the "eighties" and "nineties" during the development of suitable methods of operating for old empyemata. It was A. Boiffin who in the middle "nineties" first clearly demonstrated, through J. Gourdet, a pupil, precisely why it is the posterior portion of the rib that must be removed. Gourdet's argument is as follows:

On account of the yielding rib cartilage the anterior part of a rib can be pressed inward, whilst the posterior portion is stiff and, practically speaking, immovably connected with the vertebral column, and in any case can only be moved up and down a little. Further, the posterior part of a rib exhibits a marked concavity forward, or, in other words, forms an arc the radius of which is much less than that of the arc of the rib otherwise; the angle of the rib forms the most prominent point in this arc behind. Any resection of the ribs which is situated in front of the angle of the scapula leaves behind a stiff, unyielding piece of rib, which in accordance with its length will prevent the soft parts from falling in and diminish the costovertebral angle. If, on the other hand, we remove the posterior stiff part of the ribs, the anterior part can very easily be turned about the costal cartilage and pressed in toward the thoracic cavity and backward toward the posterior fragment of rib, so that the entire arc of the rib decreases considerably in its curve and thereby also decreases the volume of the thorax. By this method the anterior part of the ribs is not hindered in its movements by the soft parts, which in other methods stretch over the projecting posterior end of the rib.

Which ribs, and how much of each rib, should be resected in order to be sure of obtaining the necessary effect?

Before replying to this question it is es-

sential to form a clear idea of the fact that the objects of extrapleural thoracoplasty lie in two directions, which, however, converge. One object is to produce collapse of the lung, the other is to put it out of function, the latter being in conformity with the general rule for the treatment of tuberculosis of bones and joints. But just as in the treatment of coxitis we do not hesitate to place a healthy knee into a plaster bandage, so also in thoracoplasty we may also allow the resection of ribs, even though only a portion of the lung is diseased, to extend beyond the diseased part, if we desire to prevent or at least considerably to reduce the respiratory excursions of the lung. The latter are dependent not only upon the movements of the thorax, but also upon those of the diaphragm. Our decision to go so far down, however, depends upon whether the diaphragm is immobilized and drawn up beforehand on account of extensive adhesions between the lung and the wall of the thorax on the one side and the lung and the diaphragm on the other. This condition can be ascertained by means of the Roentgen rays. For the depression of the wall of the thorax the resection of the eleventh rib would scarcely be of importance; but in addition to contributing toward the immobilization of the diaphragm it will possibly also facilitate its retraction upward in the thoracic cavity, when the lung tissue shrinks during healing. On the other hand, the tenth rib should always be resected even though the affection of the lung is restricted to the upper lobe; but the length of the piece resected will depend, both as regards the tenth and ninth ribs, upon whether the lower lobe is infected.

We can rely with tolerable certainty upon achieving this by resecting about 12 cm. of the tenth and ninth ribs and 15 cm. of the succeeding ribs up to the fourth. But of course due regard must be taken of individual cases. When there is pronounced disease in the upper lobe we must at all costs resect the second and first ribs.

The author applies local anesthesia for the soft parts, regional anesthesia of each intercostal nerve.

The incision commences, when operating in one stage, at the height of the spine of the scapula, about midway between the margin of the scapula and the spinous processes. If it is desired to remove the second rib it may be necessary to go a little higher up. However, the levator anguli scapulæ may very well be kept.

The incision is continued parallel to the spinous processes to the tenth rib, and then bends outward along the tenth or eleventh rib to the scapular line or a little farther. As the arm is drawn outward and upward, after cutting through the musculature, one can get right in under the scapula, and with the aid of broad retractors lift it away from the thoracic wall; there is then no difficulty connected with resection of as large pieces of rib as we wish. Resection begins from below, and not until the seventh or eighth rib is reached does the above-mentioned maneuver with the scapula become necessary.

After resection of the ribs yellowish-white nodules can, as a rule, be seen through the costal pleura, and by palpation hard nodules in the lung tissue can readily be felt, the size of a grain and upward to the size of a nut. The pleura is more or less thickened, but by no means so much so as we are accustomed to see in old empyemata. The musculature is sewn together with catgut, the skin with silk.

Resection of the two upper ribs is not always simple, especially when dealing with the first rib. This part of the operation can be considerably facilitated if, after resection of the fourth or third rib, we carefully cut through the periosteum and the endothoracic fascia, and then undertake a loosening of the apex of the lung, or regular apicolysis. The lung is thus removed from the ribs, and therefore no risk is run of its lesion during resection of the second and first ribs; in addition the apicolysis contributes *per se* toward further collapse of the lung. A glass drain 8 to 10 cm. long is placed in the posterior angle of the incision, and removed on the first or second day after the operation. In this manner healing undoubtedly proceeds more easily

and surely than with the tamponade previously employed.

Those who have performed these operations will know that cavities in the apex give the greatest difficulty in achieving an entirely satisfactory result. In these cases the momentary effect of thoracoplasty is often strikingly good, but sooner or later profuse expectoration and subfebrile periods may again appear, and the physical signs of a cavity again become more pronounced. Since January, 1917, the author has employed transplantation of fat in nine patients, in order to cause an obstinate cavity to collapse.

The fat is best taken from the abdomen by means of a large arc-shaped incision with the convex side outward. The skin with a quite thin layer of fat is dissected aside to a large extent, so that one can remove the subcutaneous fat with superficial fascia in one connected piece.

As far as the further fate of the transplanted fat is concerned Tuffier's investigations have shown that in aseptically healed cases it is converted into firm, fibroadipose tissue.

When operating in one stage the first part of the operation, until the sixth or fifth rib is reached, usually proceeds with normal pulse and respiration, but during the resection of the upper ribs both often increase considerably in frequency; the pulse may rise to 140-160 and the respiration to about 40. Shortly after the operation, and sometimes before its completion, the pulse often goes down to 110-120 and the respirations to 20-30. In some cases the pulse did not exceed 80-90 and the respirations 28-30, in spite of a large resection.

Narcotics must be given during the first days. It is of the greatest importance to get the patient to cough up the sputum; pain connected with coughing must therefore be prevented.

In the succeeding days there is often a rise in temperature, in favorable cases somewhat moderate, 37.4° to 38.5° C., lasting not more than four or five days. The pulse rises relatively more and remains at 110 to 120-130 for several days. In other cases the temperature may rise above 39°, the pulse to 130-140, and yet primary healing of the wound may take place. In these cases both rise in temperature and high frequency of pulse are a result of pulmonary complications. High temperature up to 40° or above, and frequency of pulse 120-140, which shows no signs of descending in the following days, give an unsatisfactory prognosis.

In favorable cases the patient recovers quickly after the operation, appetite and weight increase, temperature falls to the normal, cough diminishes, and his improved subjective condition puts him in better spirits. Some patients even have a decided conviction that the disease has released its hold on them.

The author reports on 48 extrapleural thoracoplastic operations. In his first series three died immediately after operation. In his last series of 26 patients only one died. This betterment of the immediate mortality the author ascribes to operation in two stages. Three of the four deaths were due to infection. Seven patients died subsequently of tuberculosis, one four years after operation; one died of influenzal pneumonia. Twenty-five still live. Of these the author regards fifteen fit for work, always afebrile, and tubercle bacilli can no longer be demonstrated in the sputum. Ten gave symptoms of pulmonary tuberculosis.

Complications Observed in the Treatment of Angiomata with Radium.

NEWCOMET (*Urologic and Cutaneous Review*, October, 1920) states that in a list of over two hundred cases of angioma, of which about one-half were treated with radium, some unexpected complications have been observed. The majority of these complications might have been avoided, had one an insight into the future, yet some of them were to be expected in the natural course of consequences, and it was thought that a short review of them might be given with profit to all concerned in the employment of radium as a remedial agent.

It has long been recognized by the medi-

cal profession that moles and other forms of angiomata are often the focal spots for some malignant degeneration, and in the number of cases that came under observation four were seen where malignant degeneration had occurred. While this number would appear to be comparatively small, yet we must consider that about three-fourths of all the cases observed were children, and of the remaining one-fourth, many were young adults. Had a larger number of these cases reached a more advanced age, the probability is that more of them would have suffered from this change. In the four cases here cited it is not to be inferred that malignant change took place in advanced life: quite the contrary three developed sarcomas; one was a woman past thirty, and a man and a woman under that age; while another woman about forty-five developed an epithelioma. In the last instance a hemangioma was situated upon the left side of the face and extended into the hair in the temporal region.

Most of the lesions that come under observation are upon the exposed portions of the body, and the great majority are upon the face, therefore it is the cosmetic result that is usually desired. At times, however, the position of the lesion causes it to become an annoyance to the individual. If it should be located in the axilla, on the back, or in the groin, the clothing may irritate it, perspiration or the ordinary muscular movements may also have the same effect, and give rise to sufficient trauma to cause bleeding or at least a very offensive discharge.

These cases are usually easily treated, as the removal of the lesion is all that is desired, and scarring on these less exposed parts is not objectionable.

In these instances radium will give by far the best result in the average run of cases and may be easily applied. The removal of these lesions by a surgical procedure does not always accomplish the desired result, for it must be remembered that the vessels are not normal, and have a curious way of undergoing further dilatation when, for some reason, their circulation is impeded.

Occasionally disaster will follow the application of radium, when, during the time the reaction is at its height, the patient develops some inflammatory condition of the skin, observed in one instance where measles was the complication, and in another erysipelas. The same effect is observed in very young children from rubbing of the affected part until the bruising causes it to ulcerate. It must be remembered that a certain amount of irritation is to be expected, and care must be taken to guard the part from trauma, while the reaction is at its height. Here again, if ulceration does occur under these circumstances, it is very liable to cause considerable scarring, and often the result is as disfiguring as the original lesion.

The greatest difficulty is presented when these lesions take on the character of a "port-wine stain" or a very flat pigmented mole over an extensive surface. These are the cases that usually result in failure and will develop ulcerations, telangiectasis and keloids upon the slightest degree of overradiation.

There is not the least doubt that in radium we have found one of the greatest agents for the treatment of angiomata, and, with few exceptions, the results obtained will far surpass those of any other agent or method. Yet, as with all other remedies in medicine, judgment must be employed as to when and how to apply radium and whether some other agent might be used as an auxiliary, the object being to obtain the best result, with the least discomfort to the patient.

Virulent Diphtheria Bacilli Carried by Cats.

SIMMONS (*American Journal of the Medical Sciences*, October, 1920) contributes a laboratory study on this subject, based on an experience with an elderly lady who developed a fatal diphtheric pharyngitis after close contact with a cat which had been sick one week. Moreover, a second cat which had been in close contact with the first cat became sick and died ten days later.

The patient had a grayish-brown pseudomembrane covering her uvula, tonsils, and posterior pharynx. The first cat had a small yellowish-grey pseudomembranous ulceration in the left nasal passage, and the second cat showed ulcerations of both vocal cords covered with a grayish-white false membrane. Diphtheria bacilli of intermediate virulence for guinea-pigs were isolated from all three lesions.

The X-Ray as an Essential Guide for Producing Artificial Pneumothorax in Advanced Cases of Pulmonary Tuberculosis.

KRUPP (*New York Medical Journal*, Oct. 30, 1920) observes that in advanced cases of pulmonary tuberculosis the almost constant harassing cough and frequent hemorrhages are the most difficult symptoms to treat. Narcotics and other methods are used to give relief, which is only temporary. With the production of an artificial pneumothorax the affected lung is collapsed and the annoying symptoms are more or less permanently relieved; certainly to a more marked extent than by the use of narcotics, and without their undesirable depressing effects. The purpose of the pneumothorax in these cases is not to produce a cure, primarily, but to render the patient's life more comfortable and possibly increase his chances for recovery. This relief from the harassing cough and pain will also have a favorable effect upon the morale of the patient, which is a matter of great importance in the treatment of pulmonary tuberculosis. The relief of his sufferings is what we strive for. In certain seemingly hopeless cases this treatment has caused an apparent arrestment of the disease. Three selected cases are cited in this article. Two of the advanced cases became ambulatory, after the patients had been bedridden for almost a year.

There are several important factors to be considered before a pneumothorax is tried, and the *x*-ray stands out as the essential guide to the clinician. Krupp calls attention to the aid of the fluoroscope, which is also part of the guide. With the bedside unit, the hand fluoroscope is used to great advantage. The *x*-ray plates give the pathological findings as a permanent record, while the fluoroscope gives a clue as to the mobility of the chest and the excursion of the diaphragm of the affected side. The following points were studied before pneumothorax was produced: (1) The extent of the pathology, especially as to cavities. (2) Will the opposite lung be able to furnish sufficient pulmonary tissue after the affected lung has been collapsed without throwing additional risk to the patient? (3) Pleurisy and adhesions.

In the extent of the pathological involvement of the lungs, the *x*-ray stands out as the positive guide. Cavities will always show on the *x*-ray plate, whereas they may be missed by the most thorough physical examination; and in deciding the extent of the involvement, it has been found that the roentgenological studies are the final and deciding factor.

The question of the opposite lung being able to furnish sufficient pulmonary tissue to functionate after the affected lung has been collapsed is a serious problem to determine. In a case in which one lung is involved and the other lung normal, there is no question, of course, that this is the ideal treatment. But it is in those cases in which both lungs are heavily involved, and perhaps one somewhat less than the other, that the difficulty arises. A careful study of such cases is necessary, before any attempt is made to collapse the lung. Now what is the course to follow when such is the case and the patient needs relief from his sufferings? In all probability this patient is going to die. Therefore we must be governed by the following factors, namely: the cessation of the cough, with a less copious expectoration; control of the hemorrhages and lessening the toxemia, which outweigh the risk we take in throwing additional burden on the small amount of uninvolved lung tissue remaining.

Adhesions and fibrinous pleurisy associated with a pulmonary tuberculosis, as seen by the *x*-ray plate, is another factor to be

thoroughly considered, for one cannot attempt to collapse a lung that is firmly plastered to the parietal pleura.

Of the 453 *x*-ray examinations made in the last three months, forty-six were bedside examinations. The author also made use of the hand fluoroscope. The remaining cases were examined stereoscopically. With this large number of cases to choose from for the production of an artificial pneumothorax, the problem was less difficult.

Since it is in the hemorrhage cases that the most satisfactory results are obtained, it should nevertheless be borne in mind that it is in this class of cases that the greatest risk is also taken; for while it is usually possible to presume that the hemorrhage is from the side showing the greatest involvement, still it is possible to collapse a lung showing considerable involvement when the hemorrhage might occasionally be from the lung showing the minor lesion. In these cases the *x*-ray plates have been showing small cavities in the region of the hilum of the lung that appears to be least involved. A few patients have come to the autopsy table, and on sectioning the lung the apex of the lower lobes and the middle lobe on the right side revealed very small cavities.

In a few cases fibrous bands of adhesions can be released by persistent frequent injections of air. If these bands are not too strong, the chances for collapsing the lungs are very good. The gradual tearing loose of these band-like adhesions can be beautifully studied by the radiographic examinations, as the treatments are continued. In the beginning one sees air pockets formed about the adhesions with gradual thinning out; finally the desired result, the complete separation and the collapse of the lung.

Reviews

REGIONAL ANESTHESIA. By B. Sherwood-Dunn, M.D. Illustrated. The F. A. Davis Company, Philadelphia, 1920. Price $3.50.

Although the author of this book bears a very English name, he is nevertheless a surgeon in Paris. He points out that for thirty years Réclus of Paris originated and practiced local anesthesia, injecting the tissues with a weak solution of cocaine. Of course, thousands of other surgeons have done the same thing for many years, but the point of the author is that their methods are quite different from what he calls regional anesthesia, because instead of applying the ansthetic to the terminals of the nerves, it is injected at the point of the origin of the nerve or along the trunk near its point of origin, so that the whole region supplied by that nerve and its branches is anesthetized. He claims that all the minor and most of the major operations can be performed in this way and that the growing popularity of the method has led him to produce this book. The author gives credit to Pauchet as the leading exponent of regional anesthesia in France, and states that much that he says represents Pauchet's views.

The book contains a little less than 300 pages and no less than 224 illustrations. The opening chapter deals with the advantages of regional anesthesia and its disadvantages; the second chapter deals with the syringes, needles, anesthetics, and general technique, and from here on the chapters discuss the employment of regional anesthesia in the head and neck, thorax and abdomen, pelvic organs and the extremities.

A point in which we think our readers will be particularly interested is the statement made by the author that as soon as

the concentrated solutions of cocaine had been replaced by weak solutions of less toxic agents, such as stovaine and novocaine, the deaths from regional anesthesia disappeared from surgical practice. Indeed he is unacquainted with a single case of death since the employment of these newer anesthetics. He states that death from ether has a ratio of one in 5000, which is a far higher ratio than is generally admitted in this country. He believes that by regional anesthesia there is a great reduction in post-operative dangers and thus there is a diminution of shock.

Amongst the disadvantages of regional anesthesia are the necessity of considerable training in its application, so that the author advises that he who intends to follow him should not only read this book, but practice upon the skeleton with needles of various lengths as to the best method of reaching the foramina from which nerves take their exit. A considerable degree of gentleness and skill in operative technique is also essential. To the objection that regional anesthesia often offers only a partial anesthesia, the author states that it has been his experience that out of 20 cases 12 are completely insensible, 7 are sufficiently sensible to permit of procedure without serious complaint, while one out of the 20 suffers enough to require a little ethyl chloride, an anesthetic which has not reached great popularity in this country.

He also states that before all operations the patients should be given morphine and scopolamine; in other words, his method of regional anesthesia is really a combination of twilight sleep and local anesthesia. The time necessary to induce anesthesia in the hands of an experienced assistant is ten to fifteen minutes.

The book is well printed and so heavily leaded that it is very easily read. It is a useful contribution to its subject, and while the advocates of all forms of anesthesia, other than that obtained by inhalation, are enthusiastic, we think the conclusion of the profession up to date is that the older anesthetics are usually to be preferred, but that the injection method of relieving pain is certainly indicated in certain types of cases.

PROGRESSIVE MEDICINE. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume IV, December, 1920. Lea & Febiger, Philadelphia, 1920.

The present issue of Progressive Medicine contains a little over 400 pages, the articles being written by Dr. Edward H. Goodman of Philadelphia upon Diseases of the Digestive Tract and Allied Organs; another upon Diseases of the Kidneys, by Dr. Henry R. Geyelin of New York. Genito-Urinary Diseases are covered by Dr. Charles W. Bonney of Philadelphia, and more than 100 pages are devoted by Dr. Walter E. Lee of Philadelphia to the Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures, Dislocations and Tumors; and last of all there is a practical therapeutic referendum by Dr. H. R. M. Landis.

It will be recalled that the object of Progressive Medicine is not alone to reprint the views expressed by various authors during the past twelve months, but to provide a critique so that the views of each author are, when it is deemed advisable, criticized or indorsed by the author who prepares the article. Or, in other words, each article is supposed to be a story of the advances made in that department of medicine during the past twelve months.

HEART AFFECTIONS: THEIR RECOGNITION AND TREATMENT. By S. Calvin Smith, M.S., M.D. Illustrated. The F. A. Davis Company, Philadelphia, 1920. Price $5.50.

The author of this book of a little more than 400 pages makes his contribution to medical literature because he states that contact with medical men in civil life has taught him the need of a fundamental volume on the heart. He has divided his subject into twenty-five chapters, and has evidently taken much pains in the preparation of his text. A very attractive part of the book is its large type with heavy leading, which makes it easily read. It is evident

that Dr. Smith's experience in the army gave him many facts which he is glad to include in his volume. No attempt is made by the author to quote current cardiovascular literature *in extenso*.

We believe that many practitioners will find much useful and practical information by perusing the pages of this volume.

MEDICAL CLINICS OF NORTH AMERICA, for November, 1920. W. B. Saunders Company, Philadelphia, 1920.

It will be recalled that this publisher issues six numbers a year of the Medical Clinics of North America, for which the subscription price is $12. This is Number 3 of Volume IV and is called the St. Louis number, as the contributors to its pages are practitioners in that city. The volume opens with a clinic by Dr. George Dock upon Focal Infections and Arthritis, and then proceeds to present nineteen other reports of clinics by the same number of clinicians. These clinics deal with the realm of medical practice from the basal metabolic rate in endocrine disturbance to Paget's disease of the bones, and paroxysmal tachycardia.

THE PRINCIPLES AND PRACTICE OF INFANT FEEDING. By Julius H. Hess, M.D. Illustrated. Second edition. The F. A. Davis Company, Philadelphia, 1920. Price $2.50.

Dr. Hess is head and Professor in the Department of Pediatrics in the Medical College of the University of Illinois. He has added another volume to the literature on infant feeding because he believes that he has ideas which he can put forward in such a way as to prove of practical interest and value to his fellow practitioners. That infant feeding is, of course, an infinitely important problem is admitted by every one. The author makes the striking statement that the mortality of the first year is nearly sixty times that of the fifteenth year, and it is not until we approach the eighty-fifth year of life that we meet with such a high percentage of death-rate, and most of the early mortality depends upon digestive disturbance.

The book has a preliminary chapter upon the physiology of the digestive tract, upon maternal and wet nursing, artificial feeding, and then a series of chapters upon nutritional disturbances and upon artificially fed infants, with an appendix, in which much valuable information is given as to how a young child is to be taken care of in connection with bathing, washing out the stomach, the use of the mustard bath, and notable aggregations of practical clinical points which ought to prove most valuable. The book contains a large amount of information in concentrated form and is to be recommended to men in general practice as a reliable guide.

THE SYSTEMATIC TREATMENT OF GONORRHEA IN THE MALE. By Norman Lumb, O.B.E. Second Edition. Lea & Febiger, Philadelphia and New York, 1920. Price $1.75.

This manual observes that the methods of diagnosis have been improved by the introduction of valuable media for the cultivation of the gonococcus; and the complement-fixation test, although still in the experimental stage, seems likely to become a reliable guide in diagnosis and treatment.

In confirmation of the author's word, vaccines have come to be widely used in the acute stage of gonorrhea and detoxicated vaccines are on their trial. He hopes this book will be of use not only to those called upon to assist in the numerous centers now established, but also to students completing the course of clinical instruction. A somewhat sketchy résumé of gonorrhea, its course and symptoms is given; a cursory review of the pathology and bacteriology of the infection, brief, but for the work adequate. A chapter on Examination of the Urine and of the Prostate. The author then considers what he calls Routine Treatment. He advises 2 to 4 pints of barley water every day and states it may be made a palatable drink by the addition of lemon. He cautions against spices, pickles and highly seasoned food. He advises exercises every day, and holds by the tenth day an uncomplicated case of gonorrhea should

be eating a full diet and going about as usual. He believes that urotropin is a useful drug, noting that in some patients it causes irritability of the bladder. Complete irrigation, of hot 1:8000 permanganate twice daily, is advocated. It is omitted in the presence of acute epididymitis or when the inflammation is hyperacute. Zinc may be useful toward the end of treatment.

The mixed stock vaccine gives the most satisfactory results. Following on the injection there is a negative phase, lasting from twenty-four to forty-eight hours, according to the dose and toxicity of the vaccine employed, during which the power of the blood seems to be diminished, followed by a rise in its hostility to the organisms, known as the positive phase, lasting longer than the negative phase. One positive phase can be superimposed upon another by giving injections at suitable intervals and regulating the dose carefully. Vaccine treatment, the author states, causes the speedy disappearance of pain on micturition, lessens the liability to complications, and is a sound test of cure.

The author goes into the question of detoxicating vaccine, the toxin being an endotoxin. He speaks of the electrochemical treatment of gonorrhea and mercury compounds in the management of this disease. Thereafter complications are gone over and their proper treatment.

A short, well-expressed manual, worth the student's and young practitioner's attention.

Correspondence

An Unusual Cause of Lead Poisoning.

To the Editors of the THERAPEUTIC GAZETTE.

SIRS: A wood-chopper living on the bank of a Southern river, when seen by me was so paralyzed that he could scarcely move an arm or leg. The cause was puzzling, but on inquiring as to the condition of his bowels, his reply was that they were constipated, and when first stricken he had severe colic. This gave a clue to the cause, and on examining his teeth the blue line of lead poisoning was seen, making a diagnosis certain. The question then arose, where did he get the lead? Inquiring if he had recently taken any medicine, he said he had taken medicine for hematuria, but had none of it left. Asked to describe it, he said it was a milky-looking solution, which indicated it was the acetate of lead. He recovered quickly under doses of potassium iodide. Some months later I met the physician who had attended this man, and he told me he had given him the acetate of lead for the hematuria.

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